Plasticolor 2000 GR

PLASTORE®

USER MANUAL Stepper

Manual Number: G202

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Sysmetric

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1. General Description

The Plasticolor is a gravimetric dosing system designed to handle granulated material with outputs of up to 30Kg/Hour. The Plasticolor consist four main parts:

- Control and operation unit – SMART controller with backlit display and keypad.
- Screw type feeding unit for driving material
- Weighing unit for automatic calibration of the Plasticolor's output
- Ventury conveyer for loading material

The Plasticolor supports three different modes of operation:

- Injection mode – for injection molding machines. The additive is fed according to plastification/injection cycles of the injection molding machine.
- Continuous mode – for continuous extrusion. The additive is fed continuously at a given Kg/Hour.
- Analog Mode – for continuous extrusion. The Plasticolor's output is defined by Kg/Hour or by percentage of the extruder's output and controlled by analog input (0-10Volt).

1.1. Features

- Servo / Modeling technique for accurate and stable system control
- Backlit graphical display with keypad and function keys
- Multi-language simple interface
- Galvanic isolation on all inputs and outputs (analog and digital) for electrical protection
- Isolated 10/100Mps Ethernet network connection for TCP/IP and Modbus communication
- Integrated machine data acquisition
- Remote PC control compatibility with ***Minuman*** and ***Injmon*** software
- Rigid mechanical structure
- Automatic material parameter tuning
- Easy material emptying and system cleaning
- 0.1g weighing resolution
- Loss-in-weight measurement technique
- Stepper motor operated (1600 steps per revolution)
- Screw speed control 1:600 – 0.3-225rpm
- Typical flew rate 0.05-30Kg/Hour

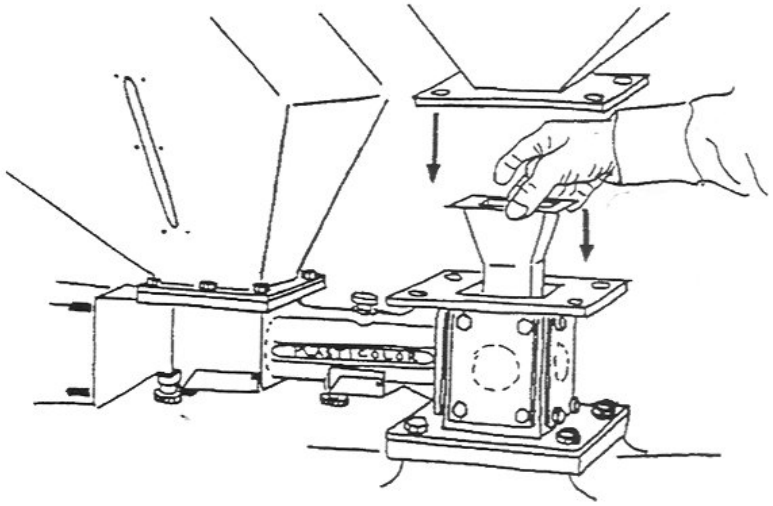
Note: this manual contains information for correct and safe installation and operation of the Plasticolor. Read this manual entirely before first operation of the Plasticolor.

2. Installation

2.1. Feeding Unit Installation

1. Remove the material hopper from the injection/extrusion machine.
2. Install the neckpiece on the injection/extrusion machine.
3. Place the inlet inside the neckpiece.
4. Reposition the material hopper on top of the neckpiece.
5. Connect the screw feeding unit of the Plasticolor to the neckpiece. Note that the unit can be connected to the neckpiece at one of four directions. Pick the direction that gives best accessibility to the operation switches and the draining ports of the Plasticolor.
6. Install the ventury conveyer – fasten the flexible hose to the material inlet at the top of the Plasticolor's hopper. Connect the compressed air pipe to the air outlet on the side of the Plasticolor's hopper.
7. Connect compressed air supply to the air inlet on the side of the Plasticolor's hopper.

Note: Supply the Plasticolor with compressed dry air 6-8bar.



Feeding unit installation

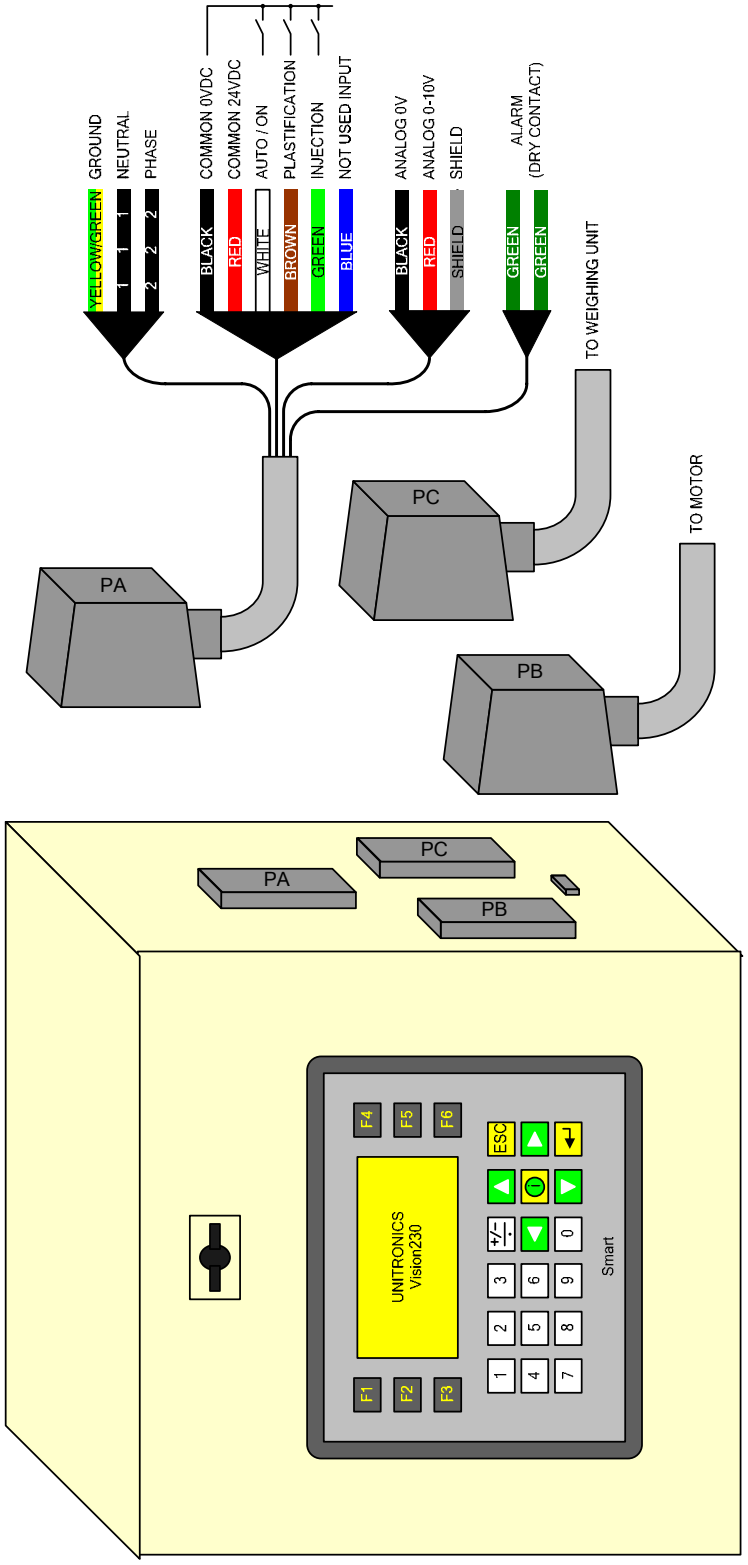
2.2. Control Unit Installation

1. Install the control cabinet near the feeding unit. Consider the controller's display accessibility when placing the cabinet.
2. Connect power supply 230Volt, 50/60Hz, 2Amp (3 wires cable in the main feeding cable PA):
   - Ground – green/yellow wire.
   - Neutral – black wire marked with the digit 1.
   - Phase – black wire marked with the digit 2.
3. wire the control cable of the Plasticolor (6 wires cable in the main feeding cable PA):
   For injection molding machine:
   - Automatic mode signal – dry contact (Normally Open) between the white wire and the black wire. If this signal is not supplied connect the white wire to the black wire permanently to set the Plasticolor to automatic mode regularly.
   - Plastification signal – dry contact (Normally Open) between the brown wire and the black wire.
   - Injection signal – dry contact (Normally Open) between the green wire and the black wire. Injection signal is optional and is used to feed additive by the Plasticolor during injections cycles. See chapter 3.2.4 for more details.

   For extrusion machine:
   - Extruder On signal – dry contact (Normally Open) between the white wire and the black wire. If this signal is not supplied connect the white wire to the black wire permanently.
4. For analog control on the Plasticolor's output wire the analog cable of the Plasticolor (shielded 2 wires cable in the main feeding cable PA). Analog control is by 0-10Volt.
5. Alarm – if needed connect the alarm cable (2 wires cable in the main feeding cable PA) to an external alarm system. The alarm cable is connected to a dry contact (Normally Open) that closes on system alarm.
6. Plug the Plasticolor's main feeding cable to the control cabinet. The plug and the socket are marked PA.
7. Plug the motor's cable to the control cabinet. The plug and the socket are marked PB.
8. Plug the control cable of the feeding unit to the control cabinet. The plug and the socket are marked PC.
9. Open the control cabinet, remove the protecting foam, lift the power supply switch (MCB) and close the cabinet.

Note: the protecting foam inside the control cabinet is for protecting the controller during shipment. Remove the foam before operating the cabinet.

Caution!
Electrical maintenance should be carried out by authorized personal only!



Power supply and control wiring

3. SMART Controller

3.1. General

The SMART controller is a PLC (Programmable Logic Controller) unit with backlit display and keypad for system operation.

The keypad includes:

- Functions keys F1 to F6 – those keys are used to switch the different operation screens. The function of each key varies and is displayed on the screen.
- Digits keys – those keys include the 0 to 9 digits and the decimal point and are used for entering numeral values for the system operation data. After typing numeral value the Enter key must be pressed in order to set the new value. The controller ignores the new value until the Enter key is pressed.
- ← Enter Key – this key is used to confirm and set numeral values. This key must be pressed after typing numeral values in order to set the new value to the controller data.
- ESC key – this key is used to cancel numeral value typing. Pressing the ESC key during numeral value typing will cancel the typing and the data will return to its previous value. In addition, quick double click on the ESC key will switch the display to the main menu screen.
- Arrows keys – up arrow, down arrow, left arrow and right arrow are used to switch between variables in screens with more the one variable.

SMART controller

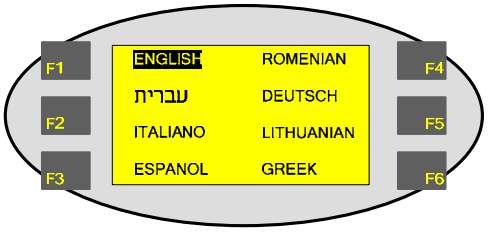
3.2. System Configuration

The SMART controller supports different modes of operation which are set during manufacturing, according to the costumer specifications, but can be reconfigured at any time. To enter the system configuration hold pressed together ESC and F1 keys for 3 seconds until the language screen appears.

3.2.1. Operation Language

Using the arrows keys move the curser to select the operation language and press ←

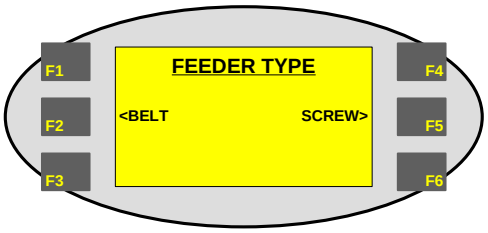
After selecting operation language the SMART will switch to Feeder Type screen.



3.2.2. Feeder Type

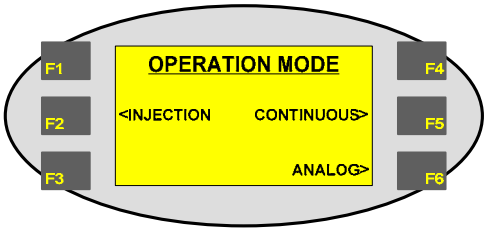
Press the corresponding F# key to select the system's feeder type:
F2 – Belt feeder
F5 – Screw feeder

After selecting feeder type the SMART will switch to Operation Mode screen.



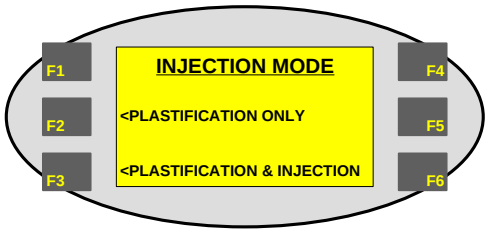
3.2.3. Operation Mode

Press the corresponding F# key to select the system's operation mode:
F2 – for injection molding machine
F5 – for continuous extrusion with output by Kg/Hour
F6 – for continuous extrusion with output controlled by analog voltage (0-10 Volt)



If injection mode was selected the SMART will switch to Injection Mode screen.
If continuous mode was selected the SMART will switch to System screen.
If analog mode was selected the SMART will switch to Analog Mode screen.

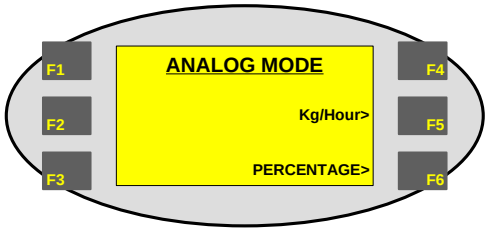
3.2.4. Injection Mode



Press the corresponding F# key to select the system's injection mode:
F2 – feeding additive only during plastification cycles of the injection molding machine. This is the common mode and it is applicable with all injection molding machines.
F3 – feeding additive during plastification cycles and during injection cycles of the injection molding machine. This mode is applicable with relatively large injection molding machines, where significant amount of the main material enters the extruder during the injection cycle, and can spread the additive more uniformly.

After selecting injection mode the SMART will switch to System screen.

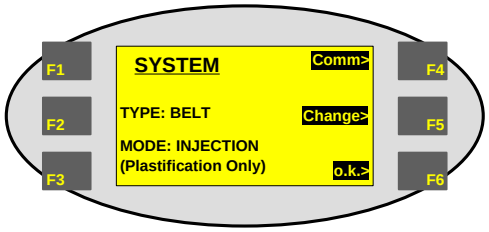
3.2.5. Analog Mode



Press the corresponding F# key to select the system's analog mode:
F5 – the Plasticolor's output is defined by Kg/Hour.
F6 – the Plasticolor's output is defined by percentage of the extrusion machine output.

After selecting analog mode the SMART will switch to System screen.

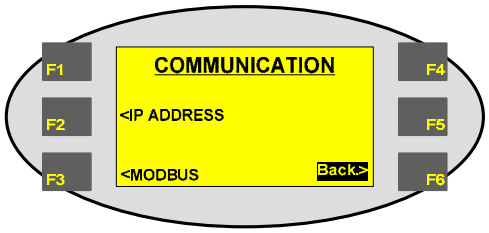
3.2.6. System



Verify the selected feeder type and system mode.
Press *Change* (F5) if you need to change the system configuration or *o.k.* (F6) to complete the system configuration.
If the SMART is connected to an Ethernet or Modbus network press *Comm* (F4) to configure the communication settings.

Refer to chapter 7 regarding data addresses in the SMART.

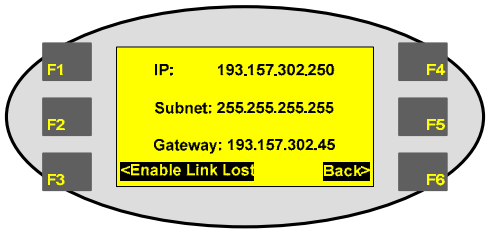
3.2.7. Communication Settings



Press the corresponding F# key to configure the communication settings:
F2 – to change the IP address of the SMART.
F3 – to activate the Modbus communication.

Refer to chapter 7 regarding data addresses in the SMART.

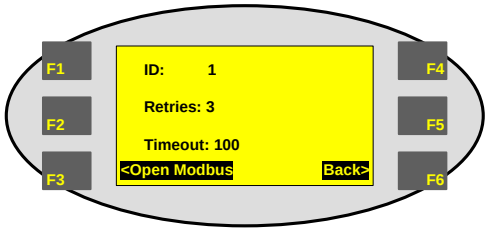
3.2.8. IP Address



Use the keypad to enter IP address, Subnet Mask and Default Gateway for the SMART. Press ← after typing each value to move to the next value. When finished press *Back* (F6) to return to the Communication screen.
If you use TCP/IP communication it is recommended to enable the *Link Lost* to automatically reconnect a lost Ethernet connection.

Note: *Link Lost* can interfere with UDP communication so it is recommended to disable the *Link Lost* when using UDP communication

3.2.9. Modbus



Use the keypad to set ID, number of Retries and the Timeout of the Modbus communication. Press ← after typing each value to move to the next value.
Press *Open Modbus* (F3) to activate the Modbus communication.
When finished press *Back* (F6) to return to the Communication screen.

There are two options for Modbus communication with the SMART:

- Using the network port of the SMART through the network socket (RJ-45) on the side of the control cabinet.
- Using serial communication through COM2 port (RJ-11) on the side of the controller.

Refer to chapter 7 regarding data addresses in the SMART.

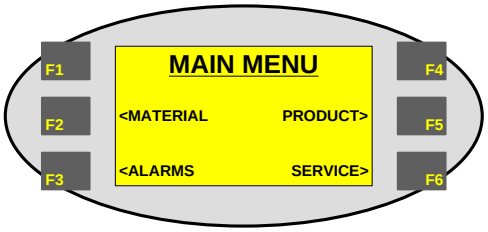
Note: the serial communication port COM2 is not galvanic isolated. Electric shock at the communication line can damage the controller. It is recommended to use the network port that is galvanic isolated.

3.3. Injection Mode

For operating the Plasticolor at injection mode the user has to set the product weight and the additive percentage. The SMART, using those parameters, will add the additive according to plastifications/injections cycles of the injection molding machine.
The SMART controller has two sub-modes of operation for injection molding machines (see chapter 3.2 for changing operation mode):

- Feeding additive only during plastification cycles of the injection molding machine. This is the common mode and it is applicable with all injection molding machines.
- Feeding additive during plastification cycles and during injection cycles of the injection molding machine. This mode is applicable with relatively large injection molding machines, where significant amount of the main material enters the extruder during the injection cycle, and can spread the additive more uniformly. In this case the user has to set the percentage of additive to be fed during injection cycles.

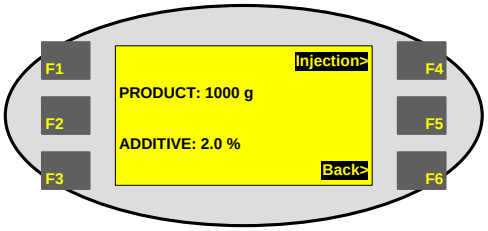
3.3.1. Main Menu



F5 – setting product weight and additive percentage
F2 – following products and material counters
F3 – watching the system's alarms
F6 – service and maintenance

Note: entering Service screen requires access code. Default code is 1234.

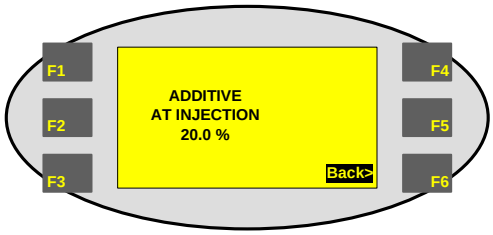
3.3.2. Product



PRODUCT – product weight. Use the keypad to enter the desired value and press ←.
ADDITIVE – additive percentage. Use the keypad to enter the desired value and press ←.
Press *Injection* (F4) to set injection parameters.
Press *Back* (F6) to return to the Main Menu screen.

Note: entering Injection screen is available only if the SMART is set to the plastification and injection operation mode (see chapter 3.2 for changing operation mode). Entering this screen requires access code. Default code is 1234.

3.3.3. Injection

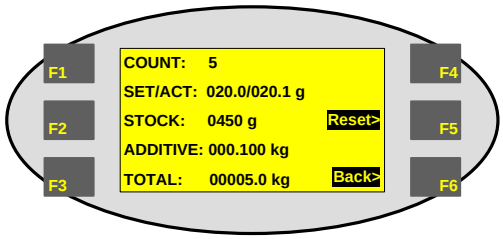


ADDITIVE AT INJECTION – percentage of additive to be fed during injection cycles of the injection molding machine. Use the keypad to enter the desired value and press ←.
Press *Back* (F6) to return to the Product screen.

Additive fed during injection cycles is part of the total percentage of additive. Setting percentage of additive at injection does not change the overall amount of additive that is fed to the injection molding machine.

Note: Injection screen is available only if the SMART is set to the plastification and injection operation mode (see chapter 3.2 for changing operation mode). Entering this screen requires access code. Default code is 1234.

3.3.4. Material



COUNT – products counter
SET/ACT – set and actual additive weight per cycle
STOCK – estimation of material stock
ADDITIVE – total weight of additive
TOTAL – total weight of main material
Press *Reset* (F5) to reset the counters.
Press *Back* (F6) to return to the Main Menu screen.

Note: *STOCK* estimation is depended on the calibration of hopper stock parameter. See chapter 8.1.4 for details.

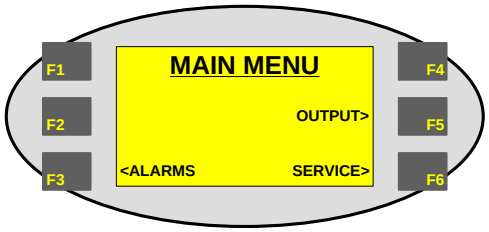
Note: Resetting the counters requires reset code. Default code is 1234. For changing the reset code contact Sysmetric.

3.4. Continuous Mode

In continuous mode the Plasticolor feeds additive continuously at a set output of Kg/Hour that is defined by the user.

3.4.1. Main Menu

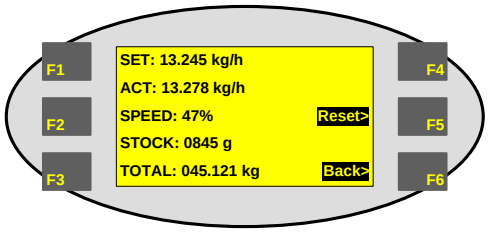
F5 – setting the required output and following material consumption
F3 – watching the system's alarms
F6 – service and maintenance



Note: entering Service screen requires access code. Default code is 1234.

3.4.2. Output

SET – defined output. Use the keypad to enter the desired value and press ←.
ACT – actual system's output
SPEED – feeder's motor speed in percentage
STOCK – estimation of material stock.
TOTAL – total weight of additive
Press *Reset* (F5) to reset the *TOTAL* counter.
Press *Back* (F6) to return to the Main Menu screen.



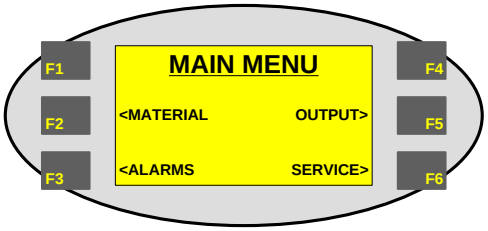
Note: *STOCK* estimation is depended on the calibration of hopper stock parameter. See chapter 8.1.4 for details.

Note: Resetting the counter requires reset code. Default code is 1234. For changing the reset code contact Sysmetric.

3.5. Analog Mode – Kg/Hour

When operating the Plasticolor in this mode the user defines the maximum output by Kg/Hour and the SMART adjusts the output relatively to the voltage at the analog input (0-10Volt).

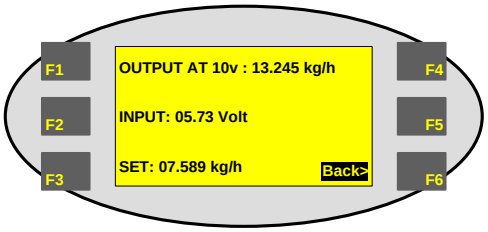
3.5.1. Main Menu



F5 – setting the maximum output at 10Volt
F2 – following material consumption
F3 – watching the system's alarms
F6 – service and maintenance

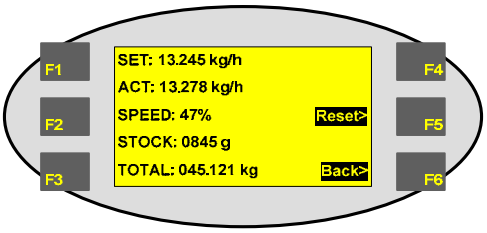
Note: entering Service screen requires access code. Default code is 1234.

3.5.2. Output



OUTPUT AT 10v – the system's output when the voltage at the analog input is 10Volt. Use the keypad to enter the required value and press ←┘.
INPUT – current analog input voltage
SET – set output of the system (calculated automatically according to the *OUTPUT AT 10v* and the *INPUT* values)
Press *Back* (F6) to return to the Main Menu screen.

3.5.3. Material



SET – set value for the system output
ACT – actual system's output
SPEED – feeder's motor speed in percentage
STOCK – estimation of material stock.
TOTAL – total weight of additive
Press *Reset* (F5) to reset the *TOTAL* counter.
Press *Back* (F6) to return to the Main Menu screen.

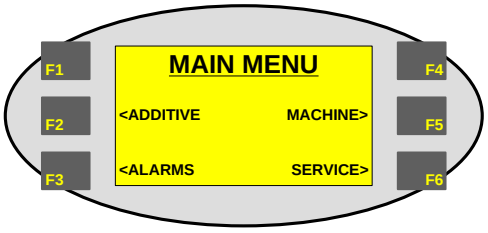
Note: *STOCK* estimation is depended on the calibration of hopper stock parameter. See chapter 8.1.4 for details.

Note: Resetting the counter requires reset code. Default code is 1234. For changing the reset code contact Sysmetric.

3.6. Analog Mode – Percentage

When operating the Plasticolor in this mode the user defines the output of the extrusion machine at 10Volt and the required percentage of additive and the SMART adjusts the output relatively to the voltage at the analog input (0-10Volt).

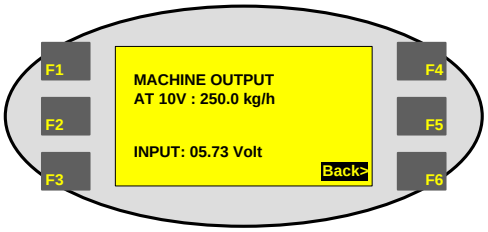
3.6.1. Main Menu



F5 – setting the extrusion machine output at 10Volt
F2 – setting additive percentage and following material consumption
F3 – watching the system's alarms
F6 – service and maintenance

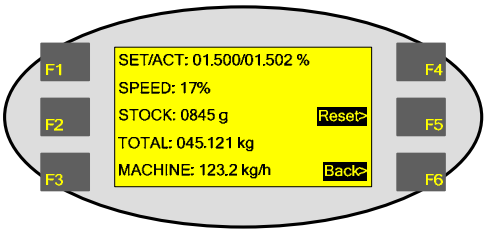
Note: entering Service and Machine screens requires access code. Default code is 1234.

3.6.2. Machine Output



MACHINE OUTPUT AT 10V – the extrusion machine output when the voltage at the analog input is 10Volt. Use the keypad to enter the required value and press ←.
INPUT – current analog input voltage
Press *Back* (F6) to return to the Main Menu screen.

3.6.3. Additive



SET/ACT – set and actual percentage of additive. Use the keypad to enter the required set percentage and press ←.
SPEED – feeder's motor speed in percentage
STOCK – estimation of material stock.
TOTAL – total weight of additive
MACHINE – the current extrusion machine output
Press *Reset* (F5) to reset the *TOTAL* counter.
Press *Back* (F6) to return to the Main Menu screen.

Note: *STOCK* estimation is depended on the calibration of hopper stock parameter. See chapter 8.1.4 for details.

Note: Resetting the counter requires reset code. Default code is 1234. For changing the reset code contact Sysmetric.

4. Screw Selection and Installation

4.1. Screw Selection

Selecting the appropriate screw for the feeding unit is done according to the outputs required from the Plasticolor. If the Plasticolor is working at continuous mode (on extrusion machine) select a screw that will fit the expected outputs. If the Plasticolor is working at injection mode (on injection molding machine) compute the continuous output in order to select an appropriate screw.

4.1.1. Output at Injection Mode

In order to select an appropriate screw for the feeding unit of the Plasticolor when working at injection mode, compute the continuous output of the screw according to the following formula:

$$Output = Product \times \frac{Additive}{Fill\ \ Time} \times \frac{36}{1000}$$

- Output by Kg/Hour
- Product weight by gram
- Additive by percentage
- Fill Time by seconds

4.2. Screw Types

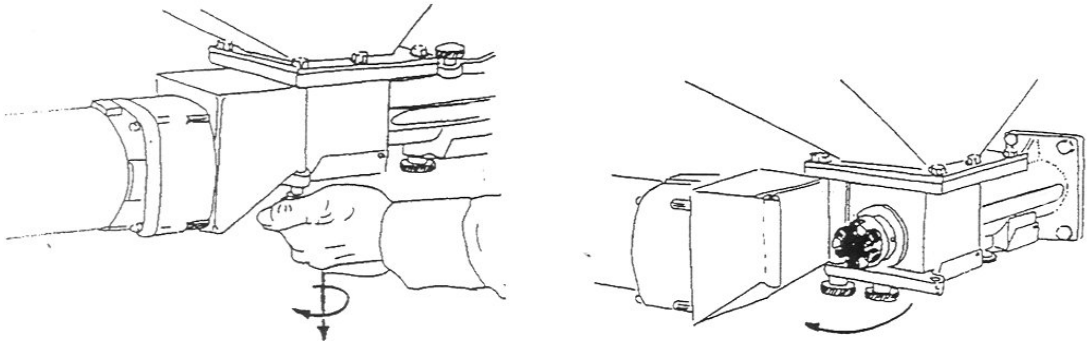
The following table details the available screws for the Plasticolor and their typical outputs:

Screw Type	6/12 White	8/15 Silver	10/17 Orange	13/20 Purple	15/22 Gold	17/25 Red
Output Kg/Hour	0.05 – 1.3	0.1 – 3.7	0.2 – 7.7	0.3 – 14	0.5 – 21	0.5 – 28

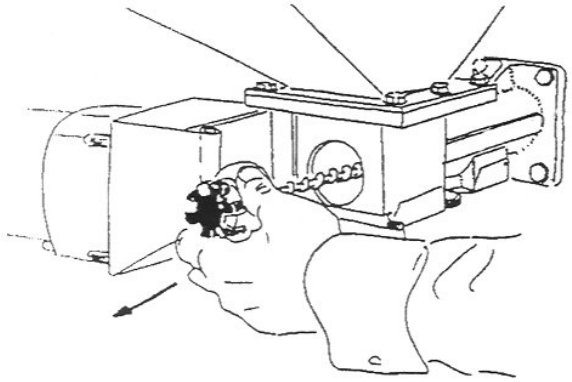
Note: the screw output is depended on material characters (shape, size, volume etc.) so the actual output might be different then stated in the table above.

4.3. Screw Installation

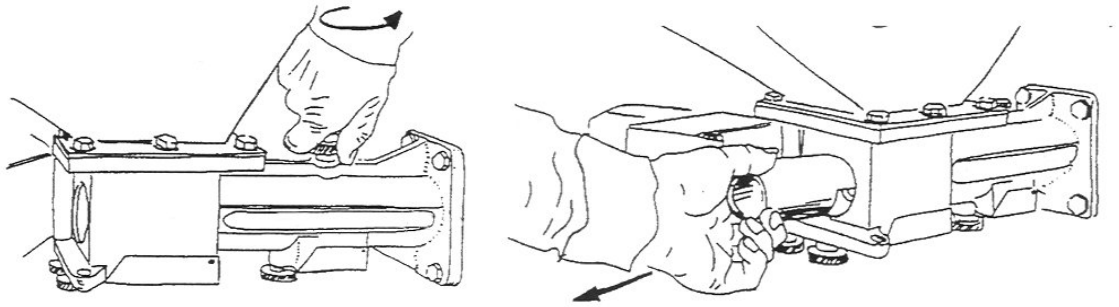
1. Empty all material from the Plasticolor by opening the drain port and the test port at the bottom of the Plasticolor.
2. Loosen and remove one of the motor hinge bolts and swing the motor aside.



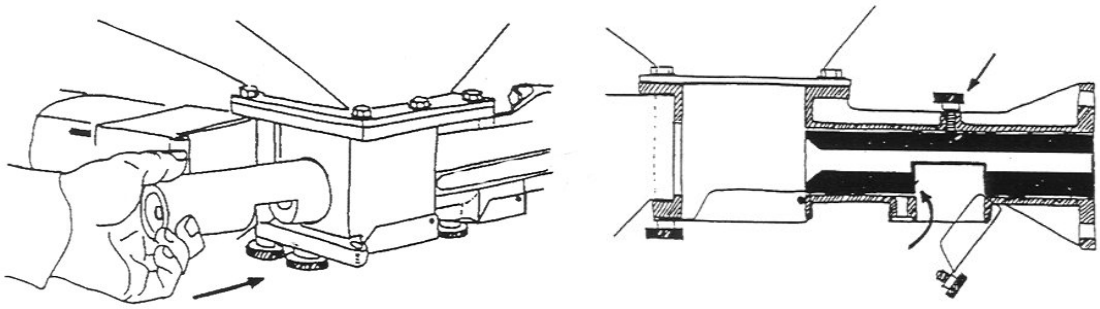
3. Pull the feeder screw out of the body housing.



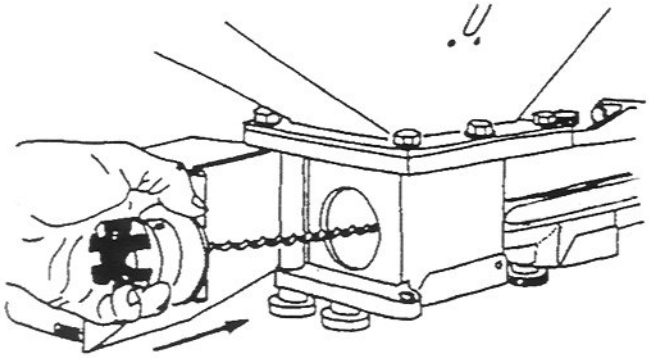
4. Loosen the locating knob on top of the feeder and pull the sleeve out of the housing.



5. Insert the new sleeve and tighten back the locating knob. Make sure that the cutout in the sleeve is facing downwards and aligned with the test port.

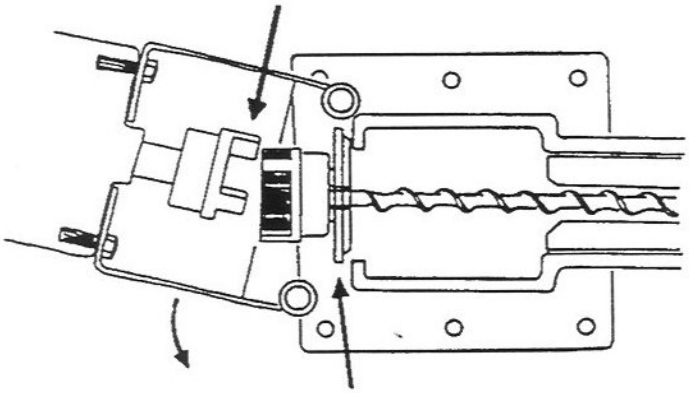


6. Insert the new feeder screw.

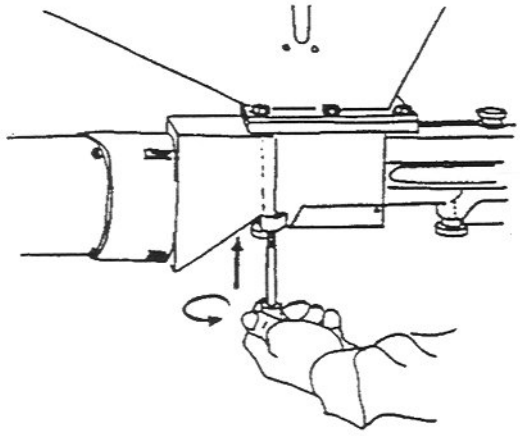


Note: never mix-up screw and sleeve combinations. They are color-coded for easy identification.

7. Turn motor shaft so that one of the coupling cogs points toward the motor hinge knob. Slide the feeder screw with the flex-coupling and housing seal out toward the motor coupling. Verify that the motor cogs fit into the flex-coupling and slowly swing the motor back into position.

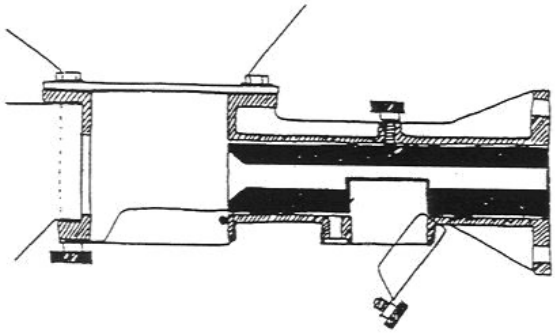


8. Re-insert and tighten the motor hinge knob.



5. Plasticolor Operation

1. Turn the conveyer switch (orange switch) to 1 to activate the conveyer. The orange lamp will light and the unit will load material into the conveyer hopper.
2. Open the test port at the bottom of the Plasticolor and place a bucket underneath.



Test port

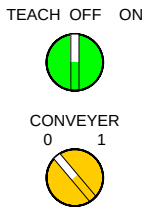
3. Turn and hold the system switch (green switch) to *TEACH* for two seconds to activate the teach cycle. The green lamp will start flashing alternately and the system will run the teach cycle to learn the material parameters needed for correct operation of the Plasticolor. During the teach cycle material will flow out through the test port to the bucket. The teach cycle lasts about 1-2 minutes and when ends the system switch lamp (green lamp) will stop flashing.

Note: the teach cycle can last up to 5 minutes depended on material characters and screw type. The teach cycle can be stopped by turning again the system switch (green switch) to *TEACH* or by turning the system switch to *ON*.

4. Using the SMART keypad enter the required parameters for the Plasticolor operation:
    - For injection mode – product weight and additive percentage.
    - For continuous mode – set output of Kg/Hour.
    - For analog mode Kg/Hour – set output at 10Volt.
    - For analog mode percentage – extrusion machine output at 10Volt and additive percentage.
5. Turn the system switch (green switch) to *ON*. The Plasticolor will start feeding material depended on the operation mode:
    - At injection mode – according to Injection/Plastification signals.
    - At continuous mode – according to Extruder On signal.
    - At analog mode – according to Extruder On signal and the voltage at the analog input.

    During operation the green lamp will flash steadily to indicate normal operation.

6. If an alarm is activated during operation the system switch lamp (green lamp) will flash rapidly. If the alarm is related to the conveyer the conveyer switch lamp (orange lamp) will flash rapidly as well.



Operation switches

5.1. Emptying material

1. Stop the Plasticolor – turn system switch to *OFF* and conveyer switch to 0.
2. Place a bucket underneath the Plasticolor and open the drain port and the test port.
3. If there is material in the conveyer hopper turn system switch to *ON* in order to open the slide gate between the hopper and the weighing chamber so that the material can drain from the hopper through the weighing bucket.
4. Open one of the motor hinge bolts and turn the motor aside. Pull out the screw and the sleeve.
5. Clean any residual material using air pressure. Remove the conveyer hopper lid and clean the hopper. Turn the hopper aside and clean the weighing chamber.
6. Close back the hopper. Reinsert the sleeve and the screw. Close the motor and tighten the hinge bolt.

5.2. Switches Lamps

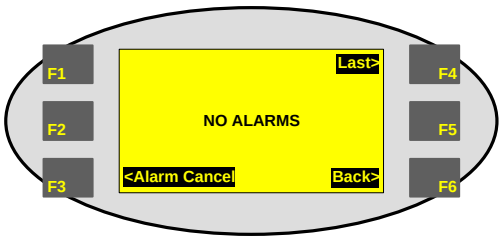
The lamps at the operation switches of the Plasticolor are used to indicate the system status. The next table describes the different indications:

Switch	Lamp Status	Indication
System (green)	off	system is off
	on	system is on
	flashing steadily	automatic mode / extruder on
	flashing alternately	system is in teach cycle
	flashing rapidly	system alarm
Conveyer (orange)	off	conveyer is off
	on	conveyer is on
	flashing rapidly	conveyer alarm

6. Alarms

The SMART is self-supervised and will report any error occurred in material handling. If an error occurs the SMART will switch to the Alarms screen and indicate the current alarm. Alarm is cancelled automatically once the error is fixed.

6.1. Alarms Screen



Press *Alarm Cancel* (F3) to close the alarm at the alarm output (dry contact) for 5 minutes. If after 5 minutes the alarm is still active the alarm output will turn on again.

The SMART logs up to 50 alarms. Press *Last* (F4) to see the last alarm of the Plasticolor. In order to clear the last alarm press *Last* together with *Alarm Cancel*.

Press *Back* (F6) to return to the Main Menu screen.

6.2. Alarms List

6.2.1. Bucket Empty

Indicates that the system failed to fill material in the weighing bucket:

- Check that the conveyer is activated and that material flows freely during conveying.
- Check the slide gate between the hopper and the weighing bucket.
- Check air supply and pressure.
- If this alarm is activated when the bucket is full with material check the weighing amplifier and the weighing loadcell and perform weighing calibration. See chapter 8.2.

6.2.2. Conveyer Alarm

Indicates that the system failed to fill the conveyer hopper (the material level proximity switch does not detect material):

- Check that material flows freely during conveying.
- Check air supply and pressure.
- If this alarm is activated when the hopper is full with material verify intactness of the material level proximity switch. See chapter 8.4.

6.2.3. Exceptional Load Voltage

Indicates that the voltage from the loadcell amplifier is too high or too low. Check the amplifier voltage at the calibration screen and:

- If the voltage is above 8.00Volt and the bucket is full with material:

  - Check intactness of the slide gate between the weighing bucket and the conveyer hopper
  - Check the air supply and pressure.
- Clean the weighing bucket and the weighing chamber and make sure nothing presses the loadcell or the weighing bucket so that they move freely up and down.
- Check the weighing amplifier voltage and the weighing loadcell. See chapter 8.2.

6.2.4. Larger Screw Needed

Indicates that the required output exceeds the system's capability:

- Change the feeder screw. See chapter 4.
- Set a lower value for the system output

6.2.5. Smaller Screw Needed

Indicates that the required output is lower then the system's minimum output:

- Change the feeder screw. See chapter 4.
- Set a higher value for the system output

6.2.6. No FLow Alarm

Indicates that material does not flow through the system:

- Search for material block in the system

6.2.7. Exceptional Injection Time

Indicates that last injection time was exceptional with respect to the average injection time:

- Check injection time of the injection molding machine
- Check system electric wiring

6.2.8. Exceptional Plastification Time

Indicates that last plastification time was exceptional with respect to the average plastification time:

- Check plastification time of the injection molding machine
- Check system electric wiring

6.2.9. PLC Battery Low

Indicates that the backup battery of the controller is weak and needs to be replaced. Contact Sysmetric regarding new battery.

6.2.10. Teach Failed

Indicates that the teach cycle has failed.

- Check material supply
- Check that material flows freely in the system
- Activate the teach cycle again

6.2.11. DM/DS Limit

Indicates that the active DM/DS reached the maximum or the minimum limit.

- Check the active DM/DS and its limits in the Model 1 screen. See Chapter **Error! Reference source not found.**.
- Make sure that material flows freely through the system feeder.
- If necessary, change the DM/DS limits as needed.

7. Communication

The SMART supports TCP/IP, UDP and Modbus communication which can be used to set and read all working parameters of the Plasticolor using a remote PC. See chapter 3.2.7 regarding communication configuration.

7.1. Data addresses

7.1.1. Continuous Mode

Function	PLC Address	Type	Action	Value	Modbus Address
Set	ML101	32 Bit	Write	00.000-99.999Kg/Hour	5303
Set New Output	MB62	1 Bit	Write	1	0063
Reset Totals	MB63	1 Bit	Write	1	0064
Alarm Code	ML100	32 Bit	Read	0-10	5301
Set	ML101	32 Bit	Read	00.000-99.999Kg/Hour	5303
Actual	ML102	32 Bit	Read	00.000-99.999Kg/Hour	5305
Speed	ML103	32 Bit	Read	0-100%	5307
Stock	ML104	32 Bit	Read	0-9999g	5309
Total	ML105	32 Bit	Read	000.000-999.999Kg	5311

7.1.2. Analog Mode Kg/Hour

Function	PLC Address	Type	Action	Value	Modbus Address
Output at 10 V	ML107	32 Bit	Write	00.000-99.999Kg/Hour	5315
Set New Output	MB62	1 Bit	Write	1	0063
Reset Totals	MB63	1 Bit	Write	1	0064
Alarm Code	ML100	32 Bit	Read	0-10	5301
Set	ML101	32 Bit	Read	00.000-99.999Kg/Hour	5303
Actual	ML102	32 Bit	Read	00.000-99.999Kg/Hour	5305
Speed	ML103	32 Bit	Read	0-100%	5307
Stock	ML104	32 Bit	Read	0-9999g	5309
Total	ML105	32 Bit	Read	000.000-999.999Kg	5311
Input Voltage	ML106	32 Bit	Read	00.00-10.00Volt	5313
Output at 10 V	ML107	32 Bit	Read	00.000-99.999Kg/Hour	5315

7.1.3. Analog Mode Percentage

Function	PLC Address	Type	Action	Value	Modbus Address
Set	ML101	32 Bit	Write	00.000-50.000%	5303
Machine Output at 10V	ML108	32 Bit	Write	000.0-999.9Kg/Hour	5317
Set New Output	MB62	1 Bit	Write	1	0063
Reset Totals	MB63	1 Bit	Write	1	0064
Alarm Code	ML100	32 Bit	Read	0-10	5301
Set	ML101	32 Bit	Read	00.000-50.000%	5303
Actual	ML102	32 Bit	Read	00.000-50.000%	5305
Speed	ML103	32 Bit	Read	0-100%	5307
Stock	ML104	32 Bit	Read	0-9999g	5309
Total	ML105	32 Bit	Read	000.000-999.999Kg	5311
Input Voltage	ML106	32 Bit	Read	00.00-10.00Volt	5313
Machine Output	ML107	32 Bit	Read	000.0-999.9Kg/Hour	5315
Machine Output at 10V	ML108	32 Bit	Read	000.0-999.9Kg/Hour	5317

- After writing new output, set "Set New Output" bit to 1 (MB62). The SMART will update the new values and will clear the bit back to 0.
- In order to reset the totals set "Reset Totals" bit to 1 (MB63). The SMART will reset the totals and will clear the bit back to 0.

7.2. Alarms Codes and Bits

The SMART alarms are indicated in two methods: a code which indicates the current active alarms and bits which indicates the status of each alarm. Both, the code and the status bits, can be used to indicate alarms in the remote control unit.
The following table details the code of each alarm as read in ML100 and the status bits.

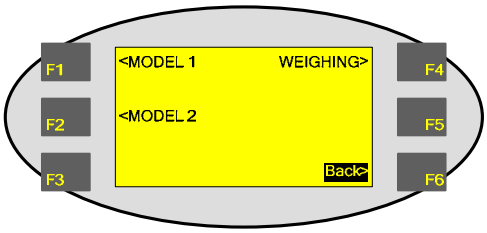
Code	Alarm	PLC Address	Type	Action	Modbus Address
0	No Alarm				
1	Exceptional Load Voltage	MB100	1 Bit	Read	0101
2	Conveyer Alarm	MB105	1 Bit	Read	0106
3	Bucket Alarm	MB110	1 Bit	Read	0111
4	Larger Screw Needed	MB115	1 Bit	Read	0116
5	Smaller Screw Needed	MB120	1 Bit	Read	0121
6	No Flow Alarm	MB125	1 Bit	Read	0126
7	Exceptional Injection Time	MB130	1 Bit	Read	0131
8	Exceptional Plastification Time	MB135	1 Bit	Read	0136
9	PLC Battery Low	MB140	1 Bit	Read	0141
10	Teach Failed	MB145	1 Bit	Read	0146
12	DM/DS Limit	MB155	1 Bit	Read	0156

8. Service and Maintenance

8.1. Service Screens

8.1.1. Service Menu

Pressing *SERVICE* (F6) at the main menu screen will switch to the service menu screen. The service menu enables weighing calibration and access to operation parameters of the Plasticolor. Take extra care using the service screens. Setting incompatible values can reduce system performance.

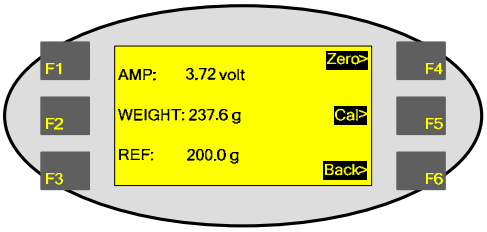


Note: entering Service screen requires access code. The default code is 1234.

8.1.2. Weighing Calibration

Weighing calibration is preformed in order to ensure that the system reports the correct weight of material in the weighing bucket. Weighing calibration is preformed during manufacturing, yet it is advised to perform calibration before first operation of the system. Recalibration should be done in the following cases:

- If any inaccuracy in the Plasticolor's output is noticed.
- If the SMART controller has been replaced.
- If the weighing amplifier has been replaced.
- If the weighing loadcell has been replaced.



AMP – weighing amplifier voltage
WEIGHT – current weight in the weighing bucket
REF – reference weight used for the calibration.

Weighing calibration is performed by the following steps:

1. Stop the system – turn system switch to *OFF* and conveyer switch to 0.
2. Empty material from the system.
3. Turn the conveyer hopper aside to gain access to the weighing bucket.
4. Make sure that the weighing bucket is empty and that *AMP* is 0±0.5Volt. If *AMP* is not 0 calibrate the weighing amplifier as detailed in 8.2.1.
5. Press *Zero* (F4) to remove tare weight. Verify that *WEIGHT* shows 0.
6. Enter the *REF* value according to the reference weight used for the calibration.
7. Put the reference weight in the weighing bucket, wait 10 seconds for the *WEIGHT* value to stable and press *Cal* (F5). Verify the *WEIGHT* shows the value of the reference weight.
8. Take the reference weight off the weighing bucket and on again. Verify that the *WEIGHT* goes down to 0 and back to the reference value accordingly. If necessary, repeat steps 1-4.

Note: valid reference weight is 100-500g.

8.1.3. Model 1 – Flow and Smaple Rate Parameters

Flow Parameter

The flow parameter DM/DS reflects the weight of material that the system feeds per one step of the motor. The flow parameter is depended on many factors such as material characters (granules size, weight, volume etc.), operation mode and more. The parameter is sampled and adjusted adaptively by the system according to the sample rate parameter DM in order to ensure correct output of the Plasticolor.
The maximum and minimum values of the flow parameter can be adjusted but this should be done only at exceptional conditions. Setting incompatible values can reduce system performance.

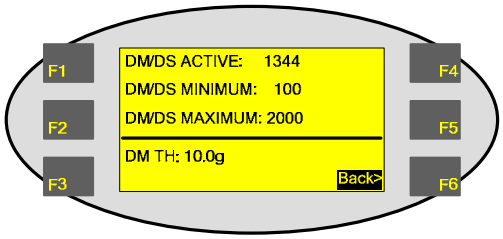
DM/DS ACTIVE – the current value of the flow parameter.
DM/DS MINIMUM – lower limit for the flow parameter. Recommended value 100.
DM/DS MAXIMUM – upper limit for the flow parameter. Recommended value 2000.

Sample Rate Parameter

The sample rate parameter determines the rate of sampling and adjusting the flow parameter. The value of the sample rate parameter can be adjusted but this should be done only at exceptional conditions. Setting incompatible values can reduce system performance.

DM TH – the sample rate of the system. Recommended value 10.0g.

Note: if the Plasticolor is set to work with output lower then 0.1Kg/Hour it is recommended to change the sample rate parameter to 5.0g.



8.1.4. Model 2 – Weighing Bucket and Hopper Stock

Weighing Bucket

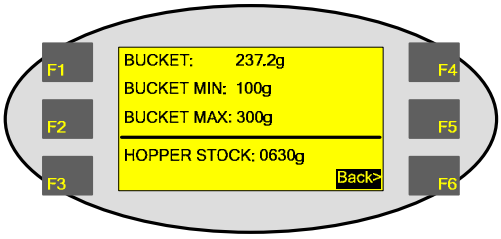
The parameters of the weighing bucket determine the thresholds of filling the bucket with material. When the weight of material in the weighing bucket goes below the minimum threshold the system starts filling the bucket. When the weight in the bucket goes above the maximum threshold the filling is stopped. The values of the weighing bucket parameters can be adjusted but this should be done only at exceptional conditions. Setting incompatible values can reduce system performance.

BUCKET – the current weight of material in the weighing bucket.
BUCKET MIN – start filling threshold. Recommended value 100g.
BUCKET MAX – stop filling threshold. Recommended value 300g.

Note: when working with materials of low density, where the volume of the weighing bucket can not hold 300g, the maximum threshold should be set to 250g or less if needed.

Hopper Stock

The hopper stock parameter is the weight of material in the hopper after conveying. This parameter is used for estimating the overall material stock in the system. In order to set this parameter, activate the conveyer before operating the system in order to fill the hopper with material, drain and weight the material and set this measured weight as the hopper stock parameter.
The value *STOCK* that will be calculated based on the hopper stock parameter is only estimated and there can be inaccuracy of up to 100g and more from the actual material weight in the system. This inaccuracy is a consequence of conveying material controlled by proximity switch, and not by weight, which result different weight of material in the conveyer hopper after each conveying cycle.



8.2. Weighing System

8.2.1. Weighing Amplifier Calibration

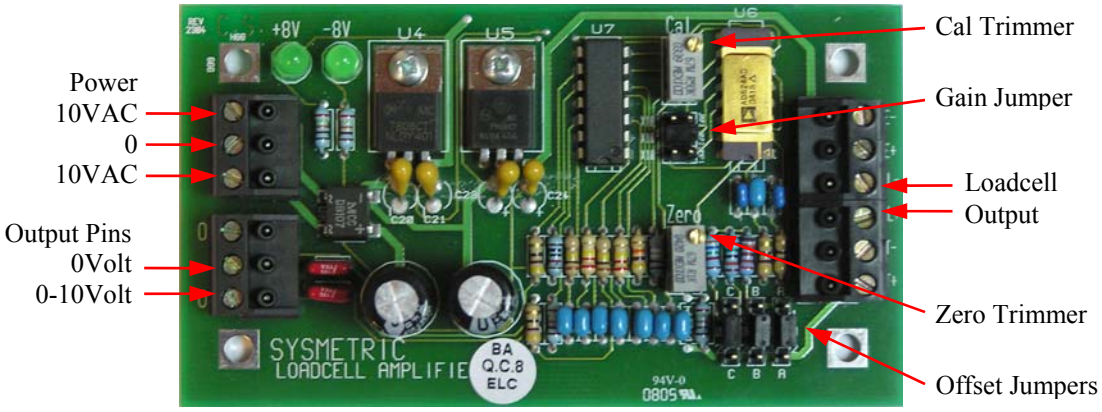
The weighing amplifier is first calibrated during manufacturing in order to adjust its working voltages for the loadcell and the controller. Recalibrating the weighing amplifier is needed if:

- The weighing amplifier has been replaced.
- The loadcell has been replaced.
- Weighing calibration can not be completed due to exceptional voltage.

Note: an exceptional voltage from the weighing amplifier is usually a consequence of mechanical interference in the system. Before calibrating the weighing amplifier in such case locate and fix the mechanical interference first. Calibrating the amplifier without finding the real cause of the exceptional voltage will solve the problem temporarily.

Weighing amplifier calibration procedure:

1. Stop the system – turn system switch to *OFF*.
2. Empty all material form the system.
3. Open the operation panel of the system. The weighing amplifier is behind it.
4. Verify that the two green LEDs (+8V and -8V) are lit. If not check the power supply voltage on the power pins. There should be two 10VAC supplies. If not, check the 10-0-10 transformer and its fuse in the SMART cabinet.
5. Verify the gain jumper is at the center position closing the pins marked 10^2.
6. Verify the offset jumpers (A, B, C) are at the center position marked 0.
7. Turn *Zero* trimmer 20 turns left, counterclockwise.
8. Turn *Cal* trimmer 20 turns left, counterclockwise.
9. Using a voltmeter, read the voltage on the output pins of the weighing amplifier and turn the *Zero* trimmer right, clockwise, until the voltage reads 0±0.1Volt. If you can not get 0Volt at this stage see the next chapter for checking the loadcell output and adjusting the offset jumpers.
10. Turn *Cal* trimmer 20 turns right, clockwise.
11. Gently place a 200g weight in the weighing bucket and verify a 3±0.5Volt on the output pins of the weighing amplifier. If using a different weight the voltage will be different accordingly. Use only 100-500g weight.
12. Close back the operation panel.
13. Perform weighing calibration as detailed in 8.1.2



Weighing Amplifier

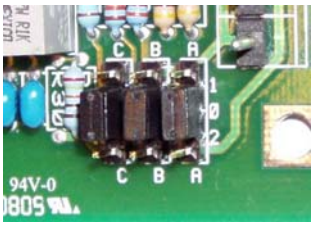
8.2.2. Loadcell Output and Offset Jumpers

Normal loadcell voltage output with no load at the weighing bucket is about ±1-2mVolt. When the loadcell is damaged it usually has some offset and will output a higher voltage. This will disturb calibrating the weighing amplifier.

If during weighing amplifier calibration it is impossible to get 0Volt when trying to calibrate the zero, check the loadcell output voltage. If the voltage is more then the normal ±2mVolt, it is recommended to replace the loadcell unit. Another option, instead of replacing the loadcell unit, is to use the offset jumpers to compensate the loadcell offset.

The offset jumpers affect the voltage in different intensities: jumper A is the least influencing while jumper C is the most. Each jumper can be in one of three positions: top – 1, middle – 0 and bottom – 2. There are a total of 27 adjustment levels, detailed in the next table:

Voltage decrease ←														→ Voltage increase													
2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	A
2	2	2	0	0	0	1	1	1	2	2	2	0	0	0	1	1	1	2	2	2	0	0	0	1	1	1	B
2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	C



Offset Jumpers

Note: in any case it is recommended to replace the damage loadcell instead of using the offset jumpers. If the offset jumpers are used to compensate offset the loadcell should be tested carefully to ensure correct weight measurement.

8.2.3. Loadcell

The loadcell test is preformed in order to ensure the accuracy of the system and that correct weight is reported from the weighing bucket. The loadcell test has three checks:

1. Hysterasis check (repeatability) – ensures no friction disturbs the loadcell and the weighing bucket.
2. Calibration check – ensures correct ratio between the loadcell voltage output and the weight reported by the system.
3. Linearity check – ensure the linearity of the loadcell.

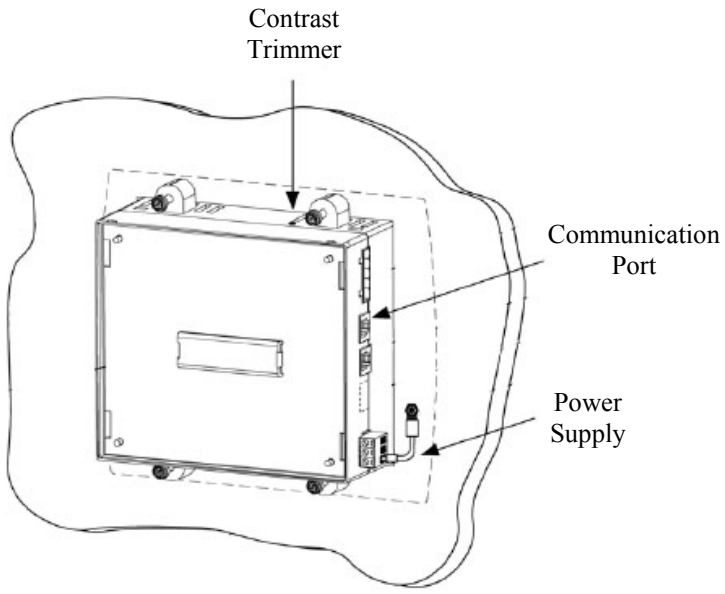
Loadcell test procedure:

1. Stop the system – turn system switch to *OFF*.
2. Empty all material form the system.
3. Open the conveyer hopper and turn it aside to gain access to the weighing chamber.
4. Clean the weighing chamber. Verify no residual material between the chamber walls and the loadcell and weighing bucket.
5. Switch the controller display to weighing calibration screen. Press *SERVICE* at the main menu and *CALIBRATION* at the service menu.
6. At this state, when the weighing bucket is empty, the amplifier voltage *AMP* should read 0±0.1Volt. If not, verify again no residual material presses the weighing bucket or the loadcell. If necessary calibrate the weighing amplifier as described in 8.2.1.
7. Wait for about 10 seconds and press *Zero* to remove tare weight. The value *WEIGHT* will show 0.
8. Hysterasis check (repeatability) – gently press the weighing bucket and release. The *WEIGHT* in the calibration screen should rise and drop back to zero (allow ±2g tolerance). Gently pull the weighing bucket. The *WEIGHT* should drop below zero and rise back to zero (allow ±2g tolerance).
9. Calibration check – press *Zero* to clear any residual offset from the previous check. Place a reference weight in the weighing bucket and verify the *REF* value corresponds with the reference weight. The *WEIGHT* value should match the reference weight (allow ±2g tolerance). If not, perform weighing calibration as detailed in 8.1.2.
10. Linearity check – put weight, different then the reference weight, in the weighing bucket and verify correct *WEIGHT* value. It is recommended to repeat this check with several different weights to check all working range.
11. Take off the weight and close back the conveyer hopper.

Note: use weights of 100-500g only. For larger hoppers see addendum.

8.3. Display Contrast

The controller's display is LCD type. Temperature changes effects the contrast of the display and it might need adjustment.
Adjusting the contrast of the display is done by turning, using a small screwdriver, the contrast trimmer. Access to the contrast trimmer is via a small hole at the upper rear side of the controller. Open the control cabinet to reach the back of the controller.



SMART Controller – Rear view

8.4. Material Level Proximity Switch

The material level proximity switch (capacitive switch – Normally Close) located in the conveyer hopper indicates the presence of material in the hopper.
When the proximity switch does not detect material the conveyer is activated to load material to the hopper. Once the proximity switch detects material the conveying is stopped.

Calibrating the sensitivity of the proximity switch is done by turning the small screw on the back of the proximity switch, according to the following steps:

1. Stop the system – turn system switch to *OFF* and conveyer switch to 0.
2. Empty material from the conveyer hopper.
3. Open the operation panel to gain access to the back of the proximity switch.
4. If the status LED on the back of the proximity switch is light skip to step 6.
5. Turn the sensitivity screw clockwise until the status LED lights.
6. Turn the sensitivity screw slowly counterclockwise until the status LED goes off. Keep on turning the screw counterclockwise half a turn more.
7. Check the operation of the proximity switch. Fill the conveyer hopper with material to cover the proximity switch and verify that the status LED lights.
8. Close back the operation panel and the conveyer hopper.

Note: the calibration as described here refers proximity switches that their status LED lights when material is detected.

Appendix A – Control Cabinet Electrical Wiring

Cable Type	Function	Wire Color
3x0.75mm^2	Ground	Green/Yellow
	Neutral	Black 1
	Phase	Black 2
2x0.75mm^2	Alarm – Dry Contact	Green
		Green
2x0.5mm^2 Shielded	Shield	Shield
	Analog 0V	Black
	Analog 0-10V	Red
6x6005 0.5mm^2	Common 0VDC	Black
	Common 24VDC (Option)	Red
	Extruder On / Automatic Mode	White
	Plastification	Brown
	Injection	Green
	Not Used Input	Blue

Appendix B – I/O Wiring

Plug PA

Pin	Function	Wire Color in Cable	Ter.	I/O	Wire Color in Cabinet	Cable Type
⏚	Ground	Green/Yellow			Green/Yellow	3x0.75mm^2
1A	Neutral	Black 1	N		Blue	
2A	Phase	Black 2	L		Brown	
3A						
4A	Alarm		R11		Green	2x0.75mm^2
5A	Dry Contact				Green	
B1	Common 0VDC	Black	–		Black	6x6005 0.5mm^2
B2	Common 24VDC (option)	Red			Not Connected	
B3	Extruder On / Automatic Mode	White		I9	Purple	
B4	Plastification	Brown		I10	White/Brown	
B5	Injection	Green		I11	White/Green	
B6	Not Used Input	Blue		I6	Blue	
B7	Not Used Output			O14	White/Black	
B8	Shield	Shield			Shield	2x0.5mm^2 Shielded
B9	Analog Input 0V	Black		ACM	Black	
B10	Analog Input 0-10V	Red		AIN1	Red	

Plug PB

Pin	Function	Wire Color in Cable	Ter.	I/O	Wire Color in Cabinet	Cable Type
A1	0VDC	Black	–		Black	12x0.5mm^2
A2	24VDC	Red	+		Red	
A3	Analog Enable	White		O13	White/Red/Black	
A4	Alarm NPN	Brown		I5	Orange	
A5	Alarm PNP	Green				
A6	Common 24VDC	Yellow	+		Red	
A7	Motor Direction	Gray		O1	White/Yellow	
A8	Motor Step	Orange	+	O0	White	
A9	Analog Speed 0V	Blue		ACOM	White/Black/Brown	
A10	Analog Speed 0-10V	Purple	-	AOUT0	White/Black/Green	

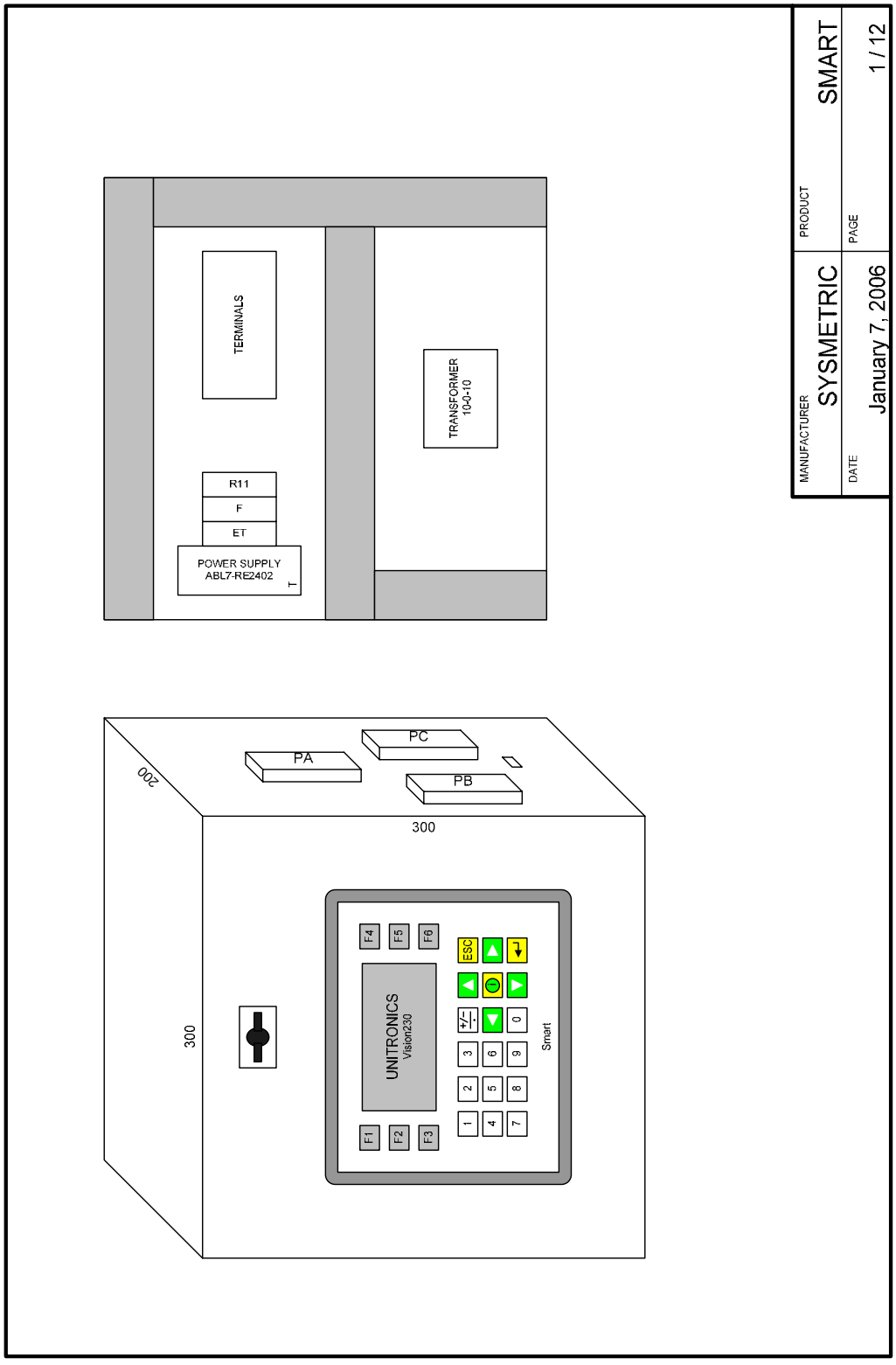
Plug PC

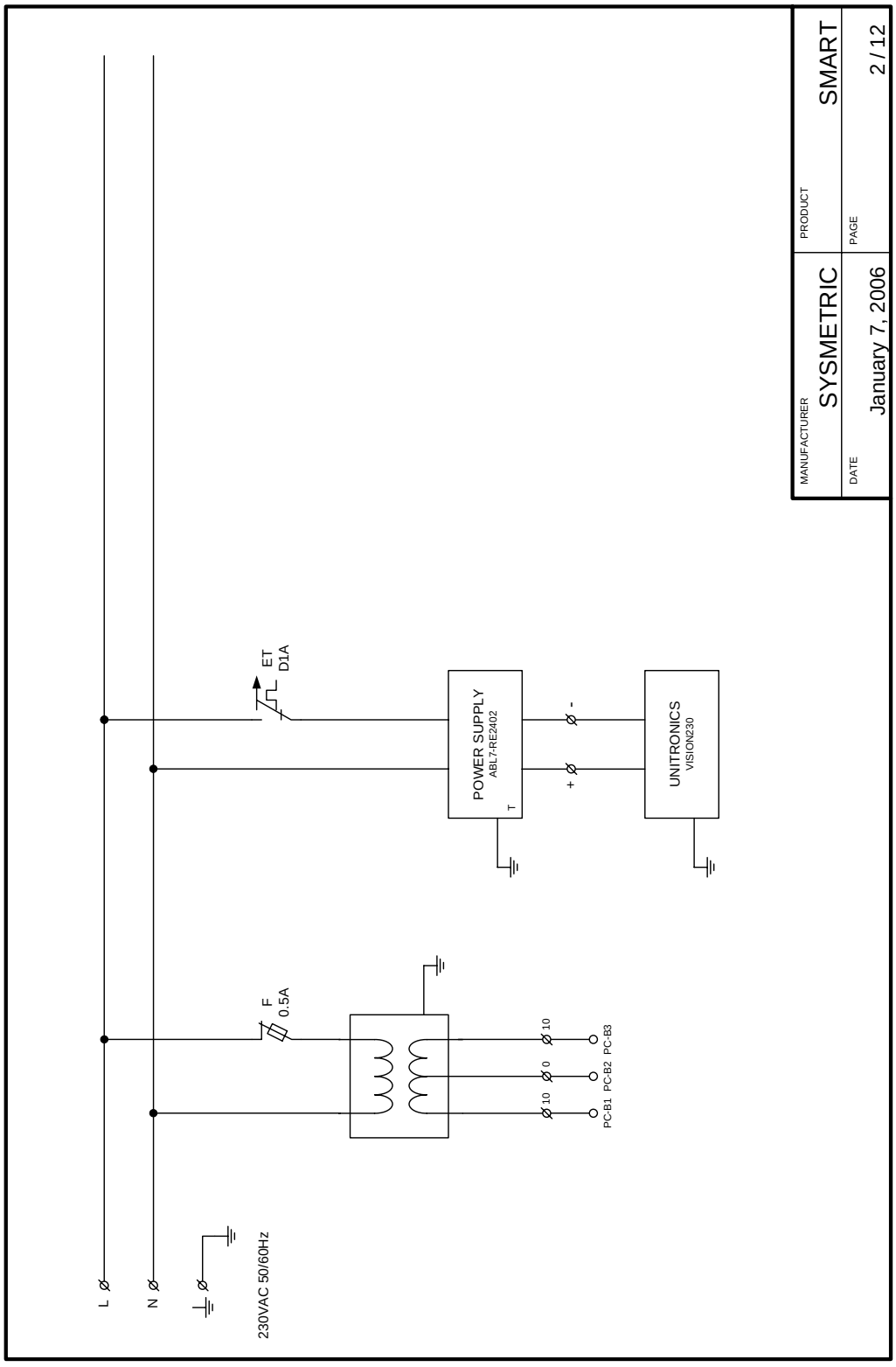
Pin	Function	Wire Color in Cable	Ter.	I/O	Wire Color in Cabinet	Cable Type
1A	0VDC	Black	–		Black	15x0.5mm^2
2A	24VDC	Red	+		Red	
3A	System Switch – On	White		I1	Brown	
4A	System Switch – Drain	Brown		I2	Green	
5A	Conveyer Switch	Green		I3	Yellow	
6A	Level Proximity Switch	Yellow		I4	Gray	
7A	System Switch Lamp	Gray		O2	White/Gray	
8A	Conveyer Switch Lamp	Orange		O3	White/Orange	
9A	Slide Gate Valve	Blue		O4	White/Blue	
10A	Conveyer Valve	Purple		O5	White/Purple	
B1	10VAC	White/Green	10		White/Black/Blue	
B2	0V	White/Yellow	0		White/Black/Yellow	
B3	10VAC	White/Blue	10		White/Black/Orange	
B4						
B5						
B6	Amplifier +	Red		AIN0	Red	2x0.5mm^2 Shielded
B7	Amplifier -	Black		ACM	Black	
B8	Amplifier Shield	Shield			Shield	
B9						
B10						

Internal Wiring

Function	Wire Color	Ter.	I/O
Alarm Relay - R11	White/Red		O16
Controller Output – O0	White		I0
Digital Outputs Power Supply – 0VDC	Black	-	0V
Digital Outputs Power Supply – 24VDC	Red	+	V1
Analog I/O Power Supply – 0VDC	Black	-	0V
Analog I/O Power Supply – 24VDC	Red	+	V2
Digital Outputs Common O2-O5 – 0VDC	Black	-	■
Digital Outputs Common O13-O16 – 0VDC	Black	-	■
Digital Inputs Common I0-I8 – 24VDC	Red	+	COM
Digital Inputs Common I9-I11 – 24VDC	Red	+	COM

Appendix C – Electrical Drawings




MANUFACTURER
SYSMETRIC
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PAGE
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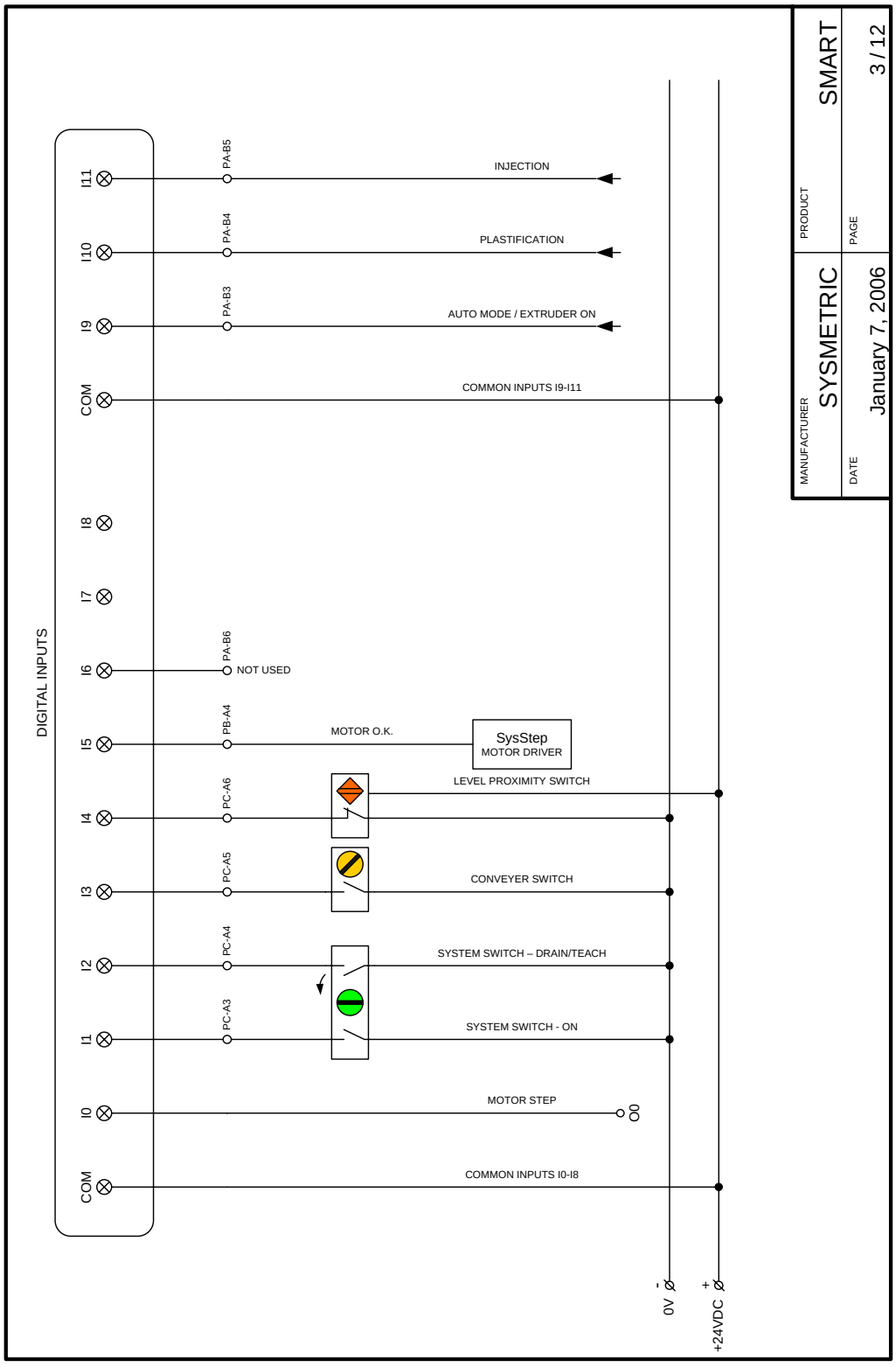
L
N
230VAC 50/60Hz
F
0.5A
ET
D1A
POWER SUPPLY
ABL7RE2402
T
+
-
UNITRONICS
VISION230
10
0
10
PC-B1
PC-B2
PC-B3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PAGE
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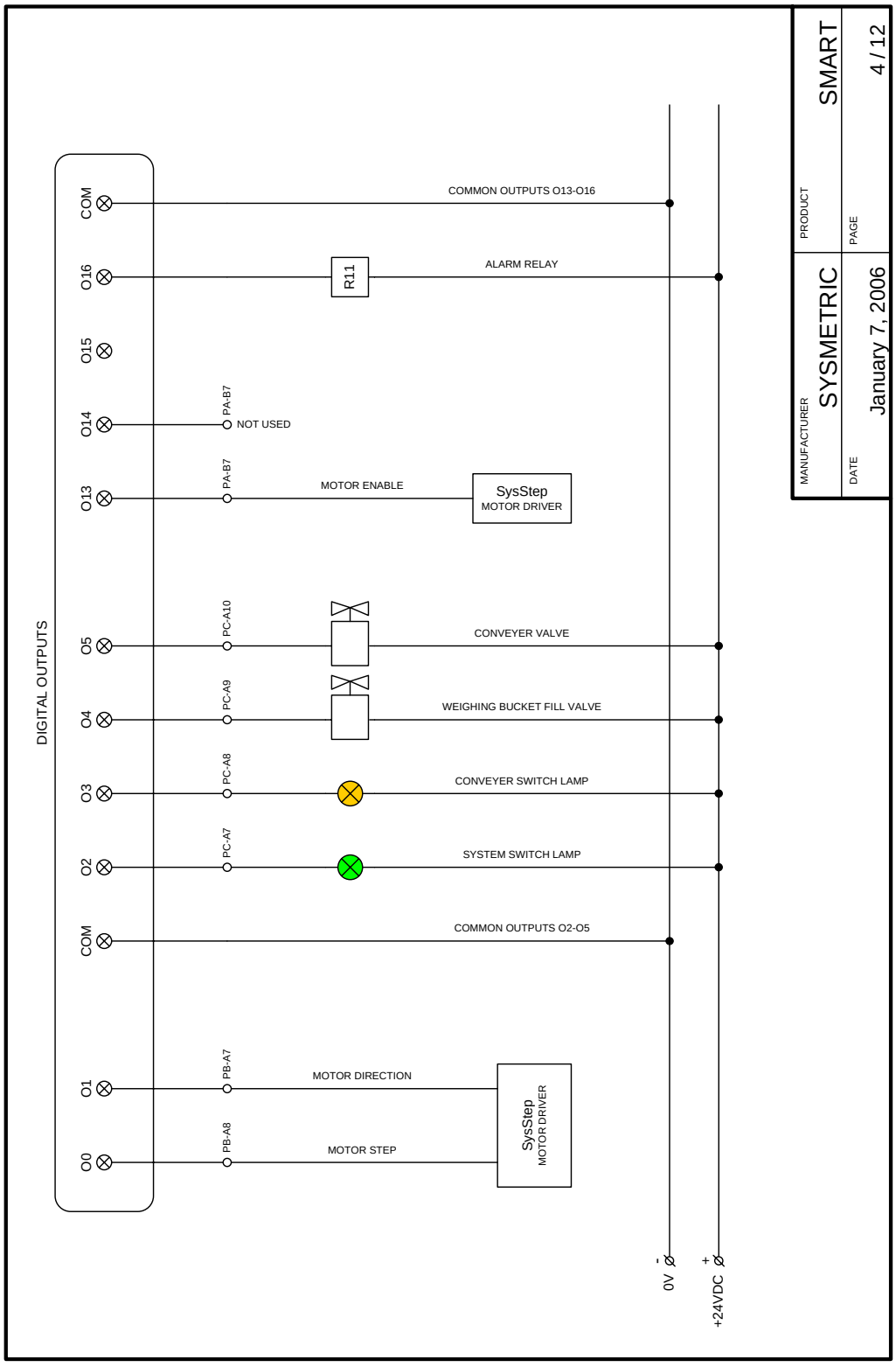
DIGITAL INPUTS
I11
I10
I9
COM
I8
I7
I6
I5
I4
I3
I2
I1
I0
COM
PA-B5
PA-B4
PA-B3
PA-B6
PB-A4
PC-A6
PC-A5
PC-A4
PC-A3
INJECTION
PLASTIFICATION
AUTO MODE / EXTRUDER ON
COMMON INPUTS I9-I11
NOT USED
MOTOR O.K.
SysStep
MOTOR DRIVER
LEVEL PROXIMITY SWITCH
CONVEYER SWITCH
SYSTEM SWITCH – DRAIN/TEACH
SYSTEM SWITCH - ON
MOTOR STEP
CO
COMMON INPUTS I0-I8
-
0V
+
+24VDC


DIGITAL OUTPUTS
COM
O16
O15
O14
O13
O5
O4
O3
O2
COM
O1
O0
COMMON OUTPUTS O13-O16
R11
ALARM RELAY
PA-B7
NOT USED
PA-B7
MOTOR ENABLE
SysStep
MOTOR DRIVER
PC-A10
CONVEYER VALVE
PC-A9
WEIGHING BUCKET FILL VALVE
PC-A8
CONVEYER SWITCH LAMP
PC-A7
SYSTEM SWITCH LAMP
COMMON OUTPUTS O2-O5
PB-A7
MOTOR DIRECTION
PB-A8
MOTOR STEP
SysStep
MOTOR DRIVER
0V -
+24VDC +
MANUFACTURER
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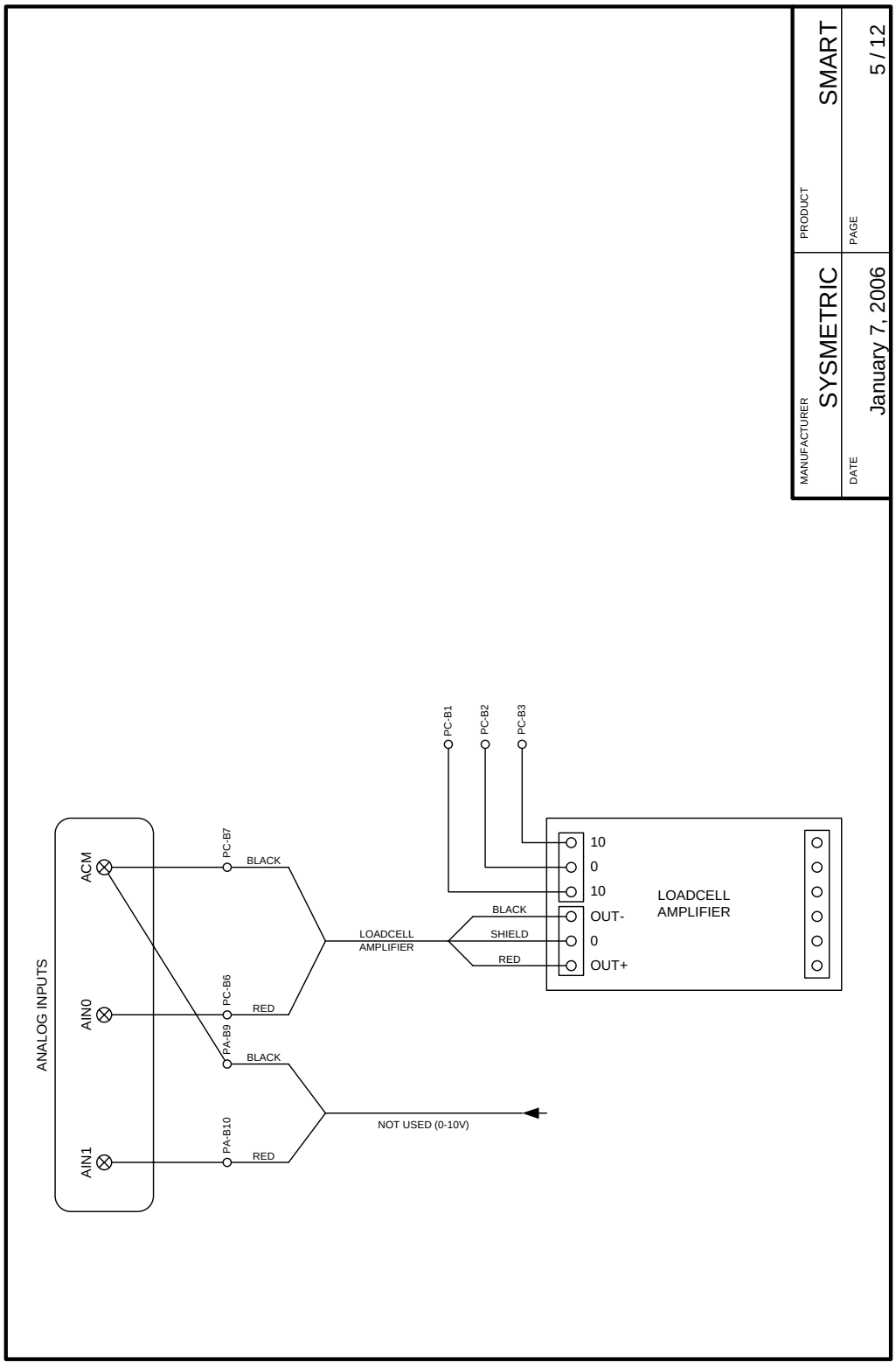
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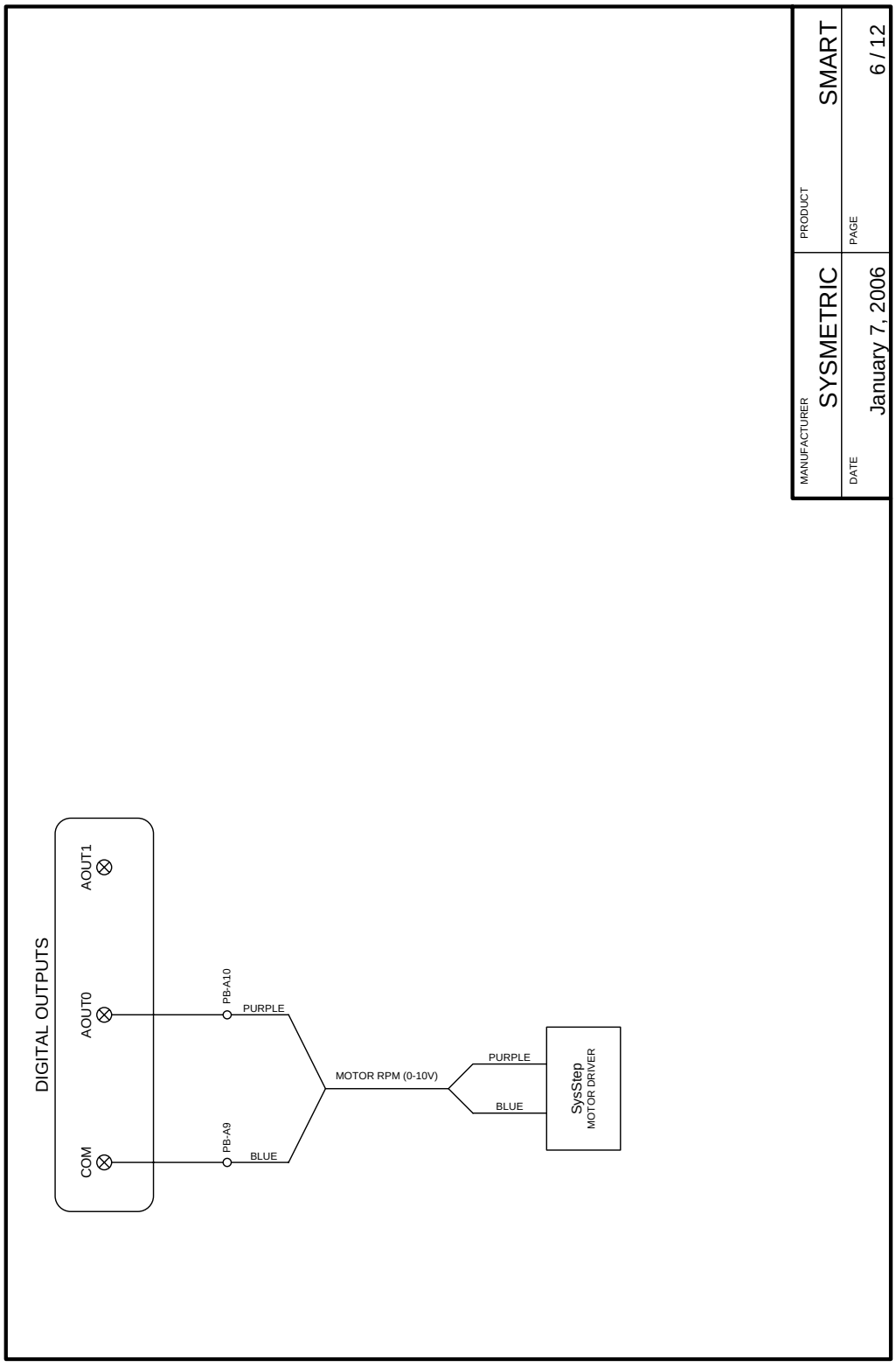
ANALOG INPUTS
ACM
AIN0
AIN1
PC-B7
PC-B6
PA-B9
PA-B10
BLACK
RED
BLACK
RED
LOADCELL
AMPLIFIER
NOT USED (0-10V)
PC-B1
PC-B2
PC-B3
10
0
10
BLACK
SHIELD
RED
OUT-
0
OUT+
LOADCELL
AMPLIFIER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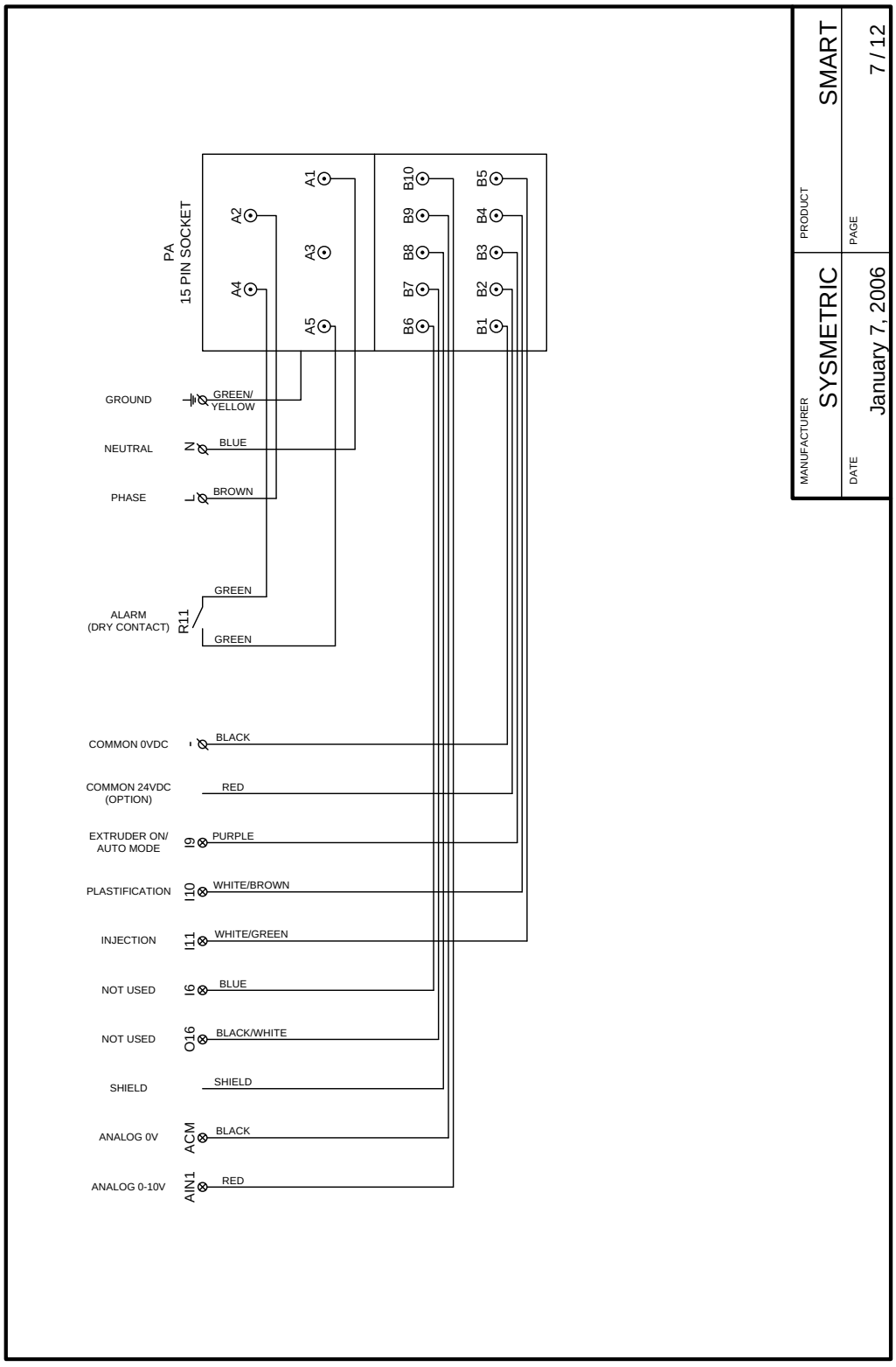
DIGITAL OUTPUTS
AOUT1
AOUT0
COM
PB-A10
PB-A9
PURPLE
BLUE
MOTOR RPM (0-10V)
PURPLE
BLUE
SysStep
MOTOR DRIVER


PA
15 PIN SOCKET
A1
A2
A3
A4
A5
B10
B9
B8
B7
B6
B5
B4
B3
B2
B1
GROUND
GREEN/
YELLOW
NEUTRAL
N
BLUE
PHASE
L
BROWN
GREEN
ALARM
(DRY CONTACT)
R11
GREEN
COMMON 0VDC
BLACK
COMMON 24VDC
(OPTION)
RED
EXTRUDER ON/
AUTO MODE
I9
PURPLE
PLASTIFICATION
I10
WHITE/BROWN
INJECTION
I11
WHITE/GREEN
NOT USED
I6
BLUE
NOT USED
O16
BLACK/WHITE
SHIELD
SHIELD
ANALOG 0V
ACM
BLACK
ANALOG 0-10V
AIN1
RED
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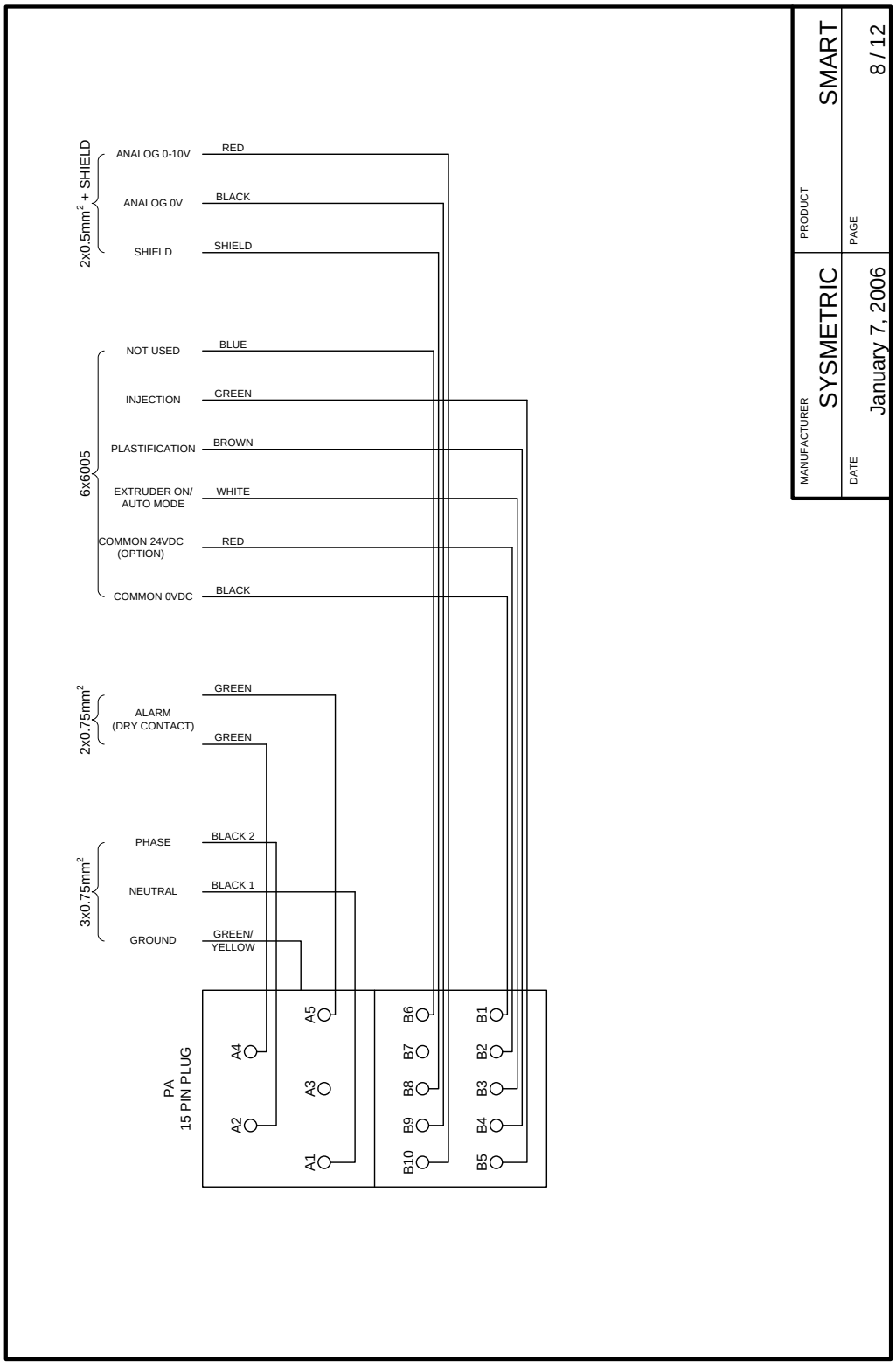
MANUFACTURER
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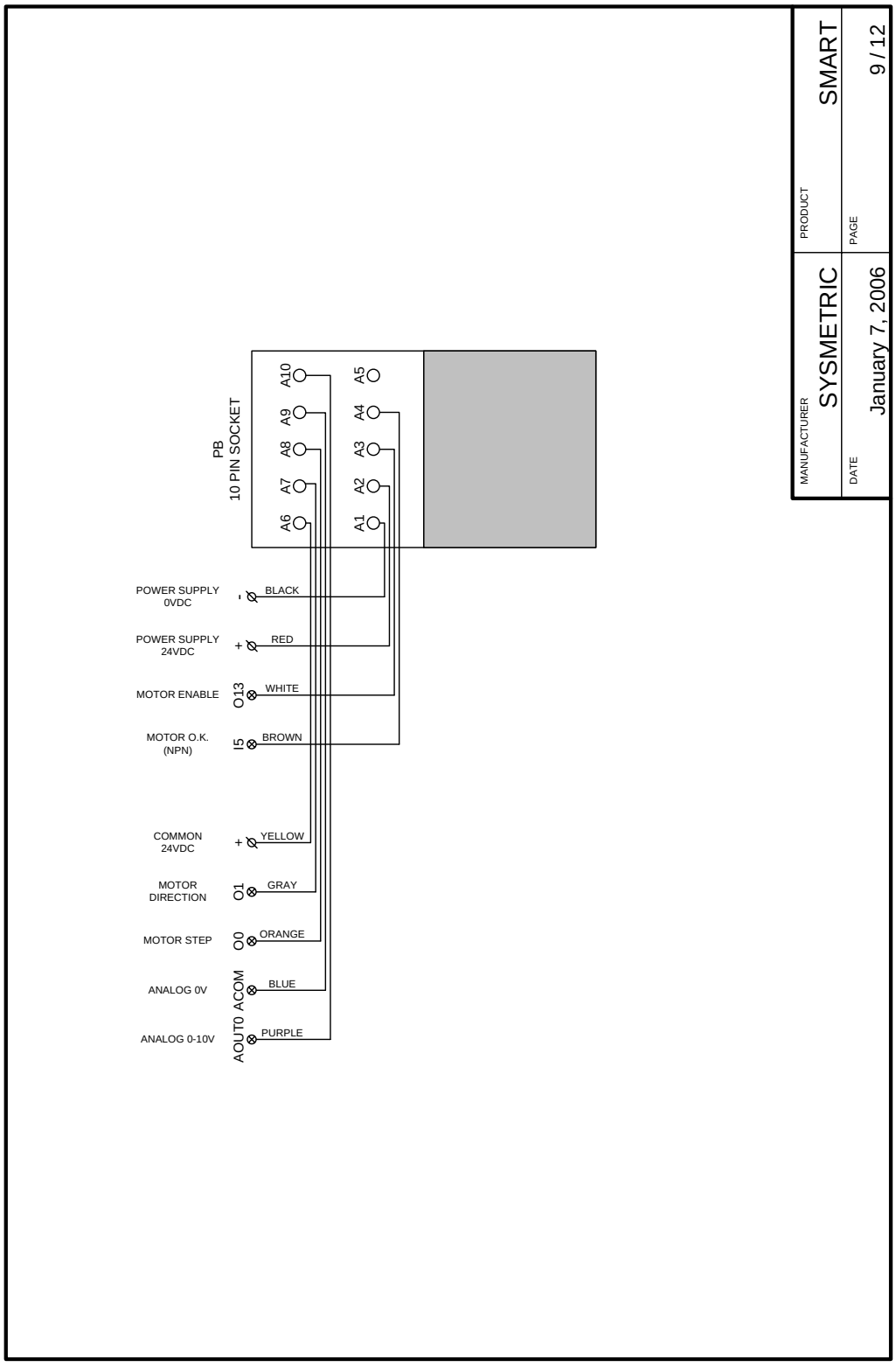
2x0.5mm² + SHIELD
ANALOG 0-10V
RED
ANALOG 0V
BLACK
SHIELD
SHIELD
6x6005
NOT USED
BLUE
INJECTION
GREEN
PLASTIFICATION
BROWN
EXTRUDER ON/ AUTO MODE
WHITE
COMMON 24VDC (OPTION)
RED
COMMON 0VDC
BLACK
2x0.75mm²
ALARM (DRY CONTACT)
GREEN
GREEN
3x0.75mm²
PHASE
BLACK 2
NEUTRAL
BLACK 1
GROUND
GREEN/ YELLOW
PA
15 PIN PLUG
A1
A2
A3
A4
A5
B10
B9
B8
B7
B6
B5
B4
B3
B2
B1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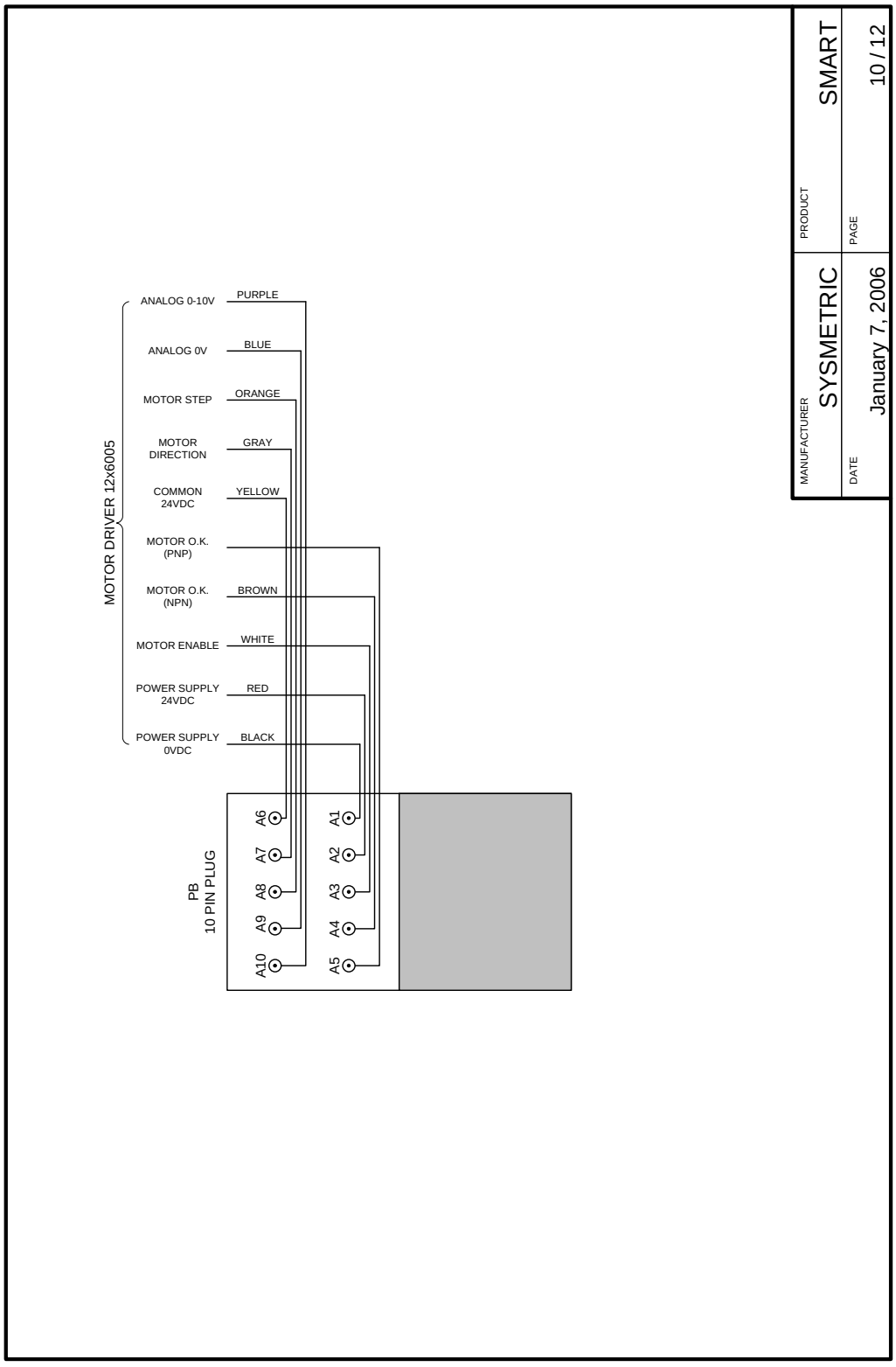
PB
10 PIN SOCKET
A10
A9
A8
A7
A6
A5
A4
A3
A2
A1
POWER SUPPLY 0VDC
-
BLACK
POWER SUPPLY 24VDC
+
RED
MOTOR ENABLE
O13
WHITE
MOTOR O.K. (NPN)
I5
BROWN
COMMON 24VDC
+
YELLOW
MOTOR DIRECTION
O1
GRAY
MOTOR STEP
O0
ORANGE
ANALOG 0V
ACOM
BLUE
ANALOG 0-10V
AOUT0
PURPLE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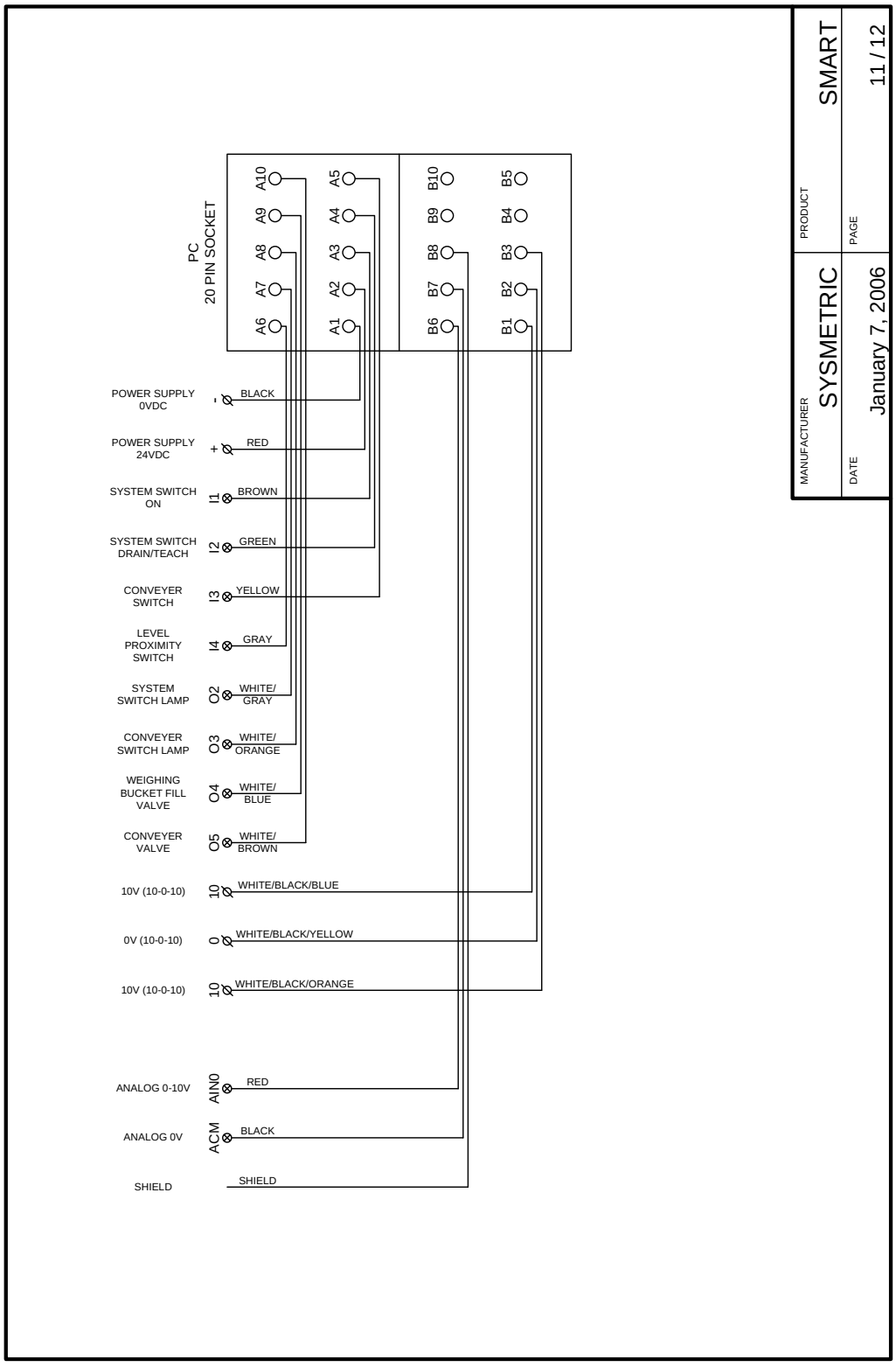
MOTOR DRIVER 12x6005
ANALOG 0-10V
PURPLE
ANALOG 0V
BLUE
MOTOR STEP
ORANGE
MOTOR DIRECTION
GRAY
COMMON 24VDC
YELLOW
MOTOR O.K. (PNP)
MOTOR O.K. (NPN)
BROWN
MOTOR ENABLE
WHITE
POWER SUPPLY 24VDC
RED
POWER SUPPLY 0VDC
BLACK
PB
10 PIN PLUG
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5


PC
20 PIN SOCKET
A10
A9
A8
A7
A6
A5
A4
A3
A2
A1
B10
B9
B8
B7
B6
B5
B4
B3
B2
B1
POWER SUPPLY 0VDC
-
BLACK
POWER SUPPLY 24VDC
+
RED
SYSTEM SWITCH ON
I1
BROWN
SYSTEM SWITCH DRAIN/TEACH
I2
GREEN
CONVEYER SWITCH
I3
YELLOW
LEVEL PROXIMITY SWITCH
I4
GRAY
SYSTEM SWITCH LAMP
O2
WHITE/ GRAY
CONVEYER SWITCH LAMP
O3
WHITE/ ORANGE
WEIGHING BUCKET FILL VALVE
O4
WHITE/ BLUE
CONVEYER VALVE
O5
WHITE/ BROWN
10V (10-0-10)
10
WHITE/BLACK/BLUE
0V (10-0-10)
0
WHITE/BLACK/YELLOW
10V (10-0-10)
10
WHITE/BLACK/ORANGE
ANALOG 0-10V
AIN0
RED
ANALOG 0V
ACM
BLACK
SHIELD
SHIELD
MANUFACTURER
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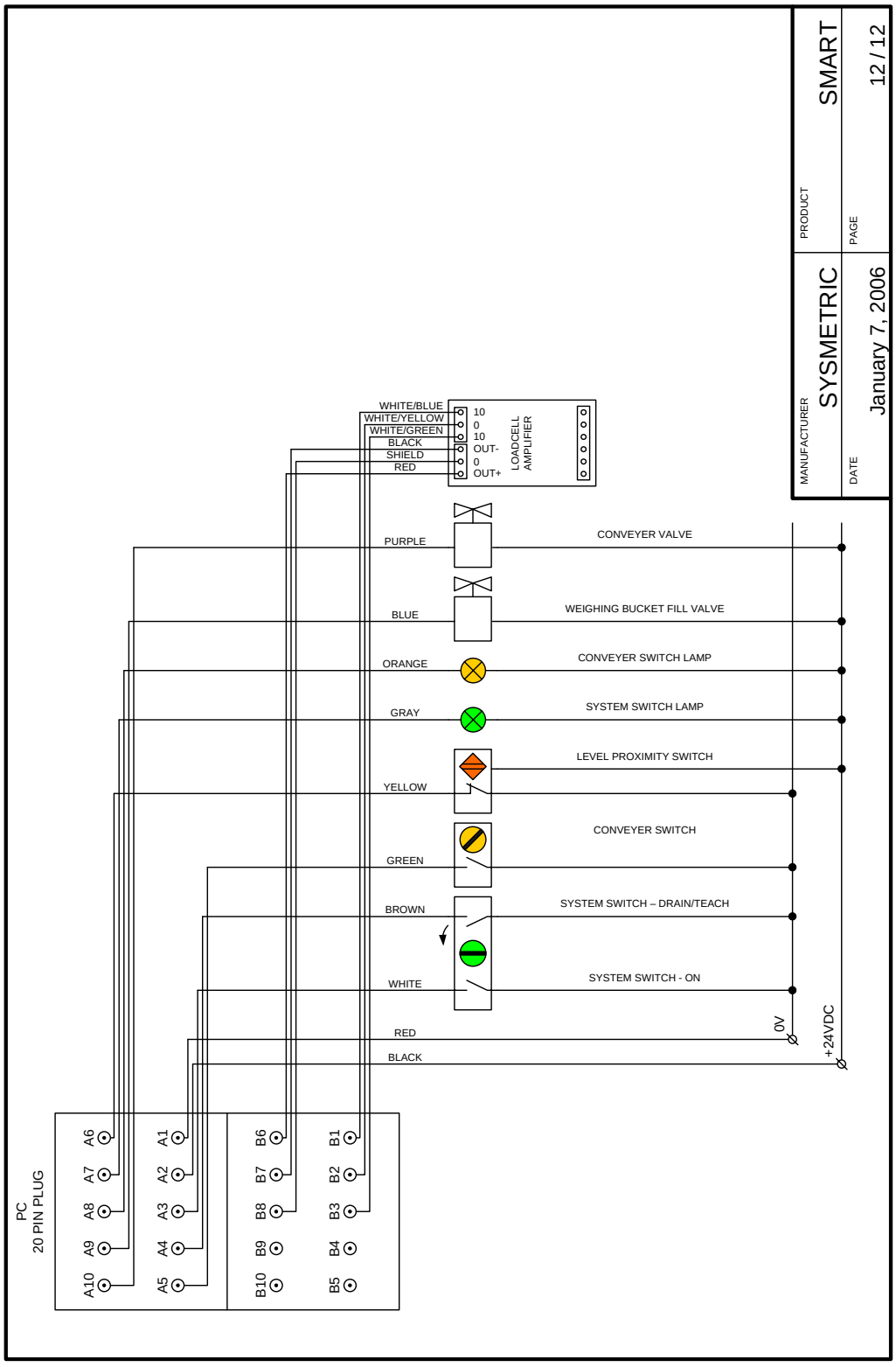
MANUFACTURER
SYSMETRIC
PRODUCT
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12 / 12
WHITE/BLUE
WHITE/YELLOW
WHITE/GREEN
BLACK
SHIELD
RED
10
0
10
OUT-
0
OUT+
LOADCELL AMPLIFIER
PURPLE
CONVEYER VALVE
BLUE
WEIGHING BUCKET FILL VALVE
ORANGE
CONVEYER SWITCH LAMP
GRAY
SYSTEM SWITCH LAMP
LEVEL PROXIMITY SWITCH
YELLOW
CONVEYER SWITCH
GREEN
BROWN
SYSTEM SWITCH – DRAIN/TEACH
WHITE
SYSTEM SWITCH - ON
0V
+24VDC
RED
BLACK
PC
20 PIN PLUG
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
B6
B7
B8
B9
B10
B1
B2
B3
B4
B5

Appendix D – System Specification

Power supply

- High voltage model: 200-240Volt, 50/60Hz, 2Amp
- Low voltage model: 100-120Volt, 50/60Hz, 4Amp

Air Supply

- 6-8Bar dry air
- 8mm fast connector

Control

- Servo / Modeling technique for accurate and stable system control
- Backlit graphical display with keypad and function keys
- Multi-language simple interface
- Galvanic isolation on all inputs and outputs (analog and digital)
- Isolated 10/100Mps Ethernet network connection
- Integrated machine data acquisition
- Remote PC control compatibility with ***Minuman*** and ***Injmon*** software

Weighing and Feeding Unit

- Rigid mechanical structure
- Automatic material parameter tuning
- Easy material emptying and system cleaning
- 0.1g weighing resolution
- Loss-in-weight measurement technique
- Stepper motor operated (1600 steps per revolution)
- Screw speed control 1:600 – 0.3-225rpm
- Typical flew rate 0.05-30Kg/Hour

Material Conveying

- Build-in ventury material conveyer
- 3 meter flexible hose

The SMART control and Hopper is manufactured by

Sysmetric Ltd
P.O.B. 1122
Afula Illit 18550, Israel
Phone: +972-4-6405857
Fax: +972-4-6405911
info@sysmetric-ltd.com
www.sysmetric-ltd.com